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GAS JOURNAL

LIGHT • HEAT • POWER • BYE-PRODUCTS

[Founded in 1849 as the "Journal of Gas Lighting."]

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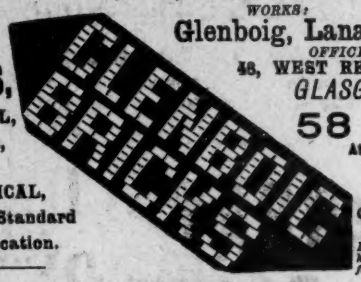

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VOL. CLXX., No. 3230.] WEDNESDAY, APRIL 8, 1925. [77TH YEAR.

EDITORIAL NOTES.

The Legislature and Gas-Electricity Supplies.

THE report of the proceedings on the Horley Gas (Electricity Supply) Bill before the Earl of Clarendon's Committee, is completed in this issue. These proceedings have more importance than merely the local aspect. They have definitely raised in Parliament the improved modern conditions of gas undertakings for economically providing an electricity supply for areas in which there is at present no such service; and, furthermore, they have brought to the knowledge of the Legislature the actual experiences of gas companies who are giving a supply of electricity, and which prove the mythical or groundless nature of the professed notion of opponents that the two services under one administration would not answer. The predictions have not materialized, as is evidenced by what Mr. A. E. Broadberry told their Lordships as to what has happened in the Wood Green area of the Tottenham District Light, Heat, and Power Company, and by Mr. H. J. Randall, regarding the developments of the Yorktown and Blackwater Gas and Electricity Company. The actual accomplishments of administration and management of the dual systems should alone be sufficient to convince Parliament that the absurd contention of electrical opponents, that a community would not be served well electrically by a gas company, has no foundation in fact. Moreover, we submit that in this connection the real question to be considered by Parliament is as to whether competition in these small districts is, from the public point of view, preferable to the economies which it is palpably obvious can be realized by an established and well-organized gas concern. Testimony in this Horley case proves that these economies can be, in the aggregate, of a substantial order; and, therefore, in the interests of a community, it is unquestionably better to permit of the development of the economies than to set up a competition which, to be profitable on both sides, must mean a loss to the communities, having regard to the limited trading potentiality in areas of small population. In such circumstances, every case requires to be considered on its merits. It is no use pointing to the fuel economies of distant large super-stations when it is learned that the transmission costs may represent some 50 to 60 p.ct. of the total cost of delivering electrical energy to the consumers in these small residential areas. A notable feature of this Horley case is that a number of expert witnesses, gas and electrical—whose positions alone warrant the genuineness of their views on the subject, and whose reputations would be in jeopardy were those views not capable of materialization—testified to many economies which must result from the combination of the two services; and we have searched the opposing evidence to find any real destructive criticism, but have failed. Not only was there the evidence in favour by Mr. Broadberry and Mr. Randall, but there was that by Mr. G. M. Gill and Mr. A. Hugh Seabrook; the last-mentioned an electrical engineer who for several years has been making a thorough study of the capabilities of gas undertakings for incorporating in their systems the supply of electricity in areas at present denied the service.

If we combine the points as to economies from the evidence of the four witnesses named, they may be taken generally to be: The existing site of a gas undertaking can be utilized for the generating station, together with railway sidings and other plant for handling material. One administration and management, and the same staff (probably slightly enlarged) can be utilized. The office accommodation and clerical staff can be employed to greater efficiency. Compared with separate undertakings, there would be a saving in rates and taxes; and in respect of work on the district, the same transport facilities would be available, and arrangements could be made so that any work required by both distribution systems could, when breaking-up streets, be carried out simultaneously. Another advantage would be in connection with the raising of capital—particularly by gas companies working under the sliding-scale. In such cases, capital would be obtained at a lower price than in the case of a new company, which had to make its way, and whose future capital-raising power would be detrimentally affected in the event of the concern not proving remunerative to the original investors. What the position of the consumers would be in such circumstances can be well imagined. In these several ways, there must be greater efficiency and economy than could be realized by two comparatively small undertakings run independently. The principal argument for super-power stations is that concentration promotes economy in respect of fuel costs; this quite apart from transmission cost considerations. We submit that, if economy can be realized by the concentration of generation, then it follows that enlarging the scope of a gas undertaking to electricity supply, thus concentrating the work in one establishment, must raise the capacity of that concern for producing greater economy.

In this case, however, we are carried further than these economies which have been put forward from time to time in connection with schemes of combined gas and electricity supplies. In technical circles, the question of the utilization of fuel in the best possible manner, in order to realize in the national interests a greater industrial efficiency and therefore economy, has been discussed for some time. In this particular instance, we have the matter in one form brought before Parliament from the point of view of the gas industry. It is true, and gas engineers do not deny it, that until quite recent times there was a considerable quantity of heat waste from gas-works processes, which there had been no serious attempt to utilize profitably. But modern practice has altered this, by using waste-heat boilers for raising steam; and in this direction, no doubt, there will be considerable developments. It is a contribution to the conservation of fuel; and now the question arises as to the application of waste heat in the case of medium and small-sized undertakings to electricity generation. At the present time, the gas industry is suffering from a slump in connection with its secondary products—coke and coke breeze among them. The problem of disposal is comparatively one of more serious moment to the smaller undertakings than to the larger ones, in view of the fact that the latter have, though producing proportionately more coke, greater opportunities for sale owing to industrial demand. In the smaller concerns, therefore, it would be a fortunate circumstance to be in a position to utilize the poorer part of the home-produced solid fuel, for which there is little local demand, for steam raising for ordinary gas-works purposes, and to put the waste heat from the gas-manufacturing processes to use for the generation of electricity. The opponents appear to be

somewhat dubious as to what can be done in this direction. Actual experience is much better than postulation and doubt, and the experience now of the use of waste-heat boilers on gas-works is of a sufficient order to act as a guide to what can actually be done. There was some attempt on the part of the opponents to belittle this aspect of the case of the Horley Company. In present circumstances, Mr. Gill computes that in the winter months, when electricity would be most required for lighting purposes, the Horley gas undertaking could generate something like 900 lbs. of steam per hour from waste heat; and by Mr. Seabrook it was calculated that in the first year the undertaking could produce from its own surplus heat something like 75 p.ct. of the electrical units which would be required, while the remainder could be met by an internal combustion engine running on gas or oil as preferred. Of course, in the event of the gas sales increasing, the available surplus heat would be augmented. Mr. Seabrook also alluded to those engineers who scoff at the suggestion that gas-works produce sufficient surplus heat to be of any use for the production of electrical energy—in fact, he hinted that some well-known men had described it as a "stunt." The "stunt" is a very substantial and paying practice in gas-works to-day; and in confirmation of this, Mr. Seabrook told of one gas company who are at their largest works putting down a 2000-kw. plant; the whole of the steam used being produced by surplus-heat boilers. The same company are also considering the cost of converting the surplus heat to electricity, and disposing of it to outside users. One or two other large undertakings have experimented, and are prepared to spend a considerable capital sum in proving the idea.

Now that the utilization of waste heat and other fuel supplies in gas-works has been raised to the Parliamentary platform, it must be kept there, and insistence be made as to its recognition as a contribution from the gas industry to the pressing problem of the conservation of our national fuel resources by the co-ordination of the use of fuel, whatever its nature, in public and industrial service. In the controversy that is sure to arise, we would ask the opponents of the gas industry not to do as was done in this Horley case—compare the results of the working of electricity undertakings of large magnitude with the small plants run by gas undertakings in formerly electrically neglected areas. There must be comparison of like with like.

One other point. The Horley Gas Company in this matter of applying for electricity powers have been placed at a distinct disadvantage by the political disturbances of recent years. It was as far back as November, 1923, that public announcement was made, at a meeting of the Gas Companies' Protection Association, of the proposed introduction of a Bill to empower gas undertakings to apply to the Electricity Commissioners for Supply Orders; and the Bill had been under consideration some time prior to that. The Bill is the one which was introduced by Mr. Reginald Clarry; but through the political upheavals of recent times, it has not been able to reach the Statute Book, though there is good chance of its doing so now. The Horley Gas Company delayed their application for supply powers in the hope of realizing them (by the authorization to be conferred by the General Bill) through the Electricity Commissioners. A local Electricity Company were thus able to forestall them. Hence the Bill. But expedition is on the side of an Order; and the Electricity Commissioners succeeded in dealing with the Electricity Company's application, despite the objections raised by the Gas Company, before the latter could get their Bill under way in Parliament. Fortunately, however, the Order has not yet been confirmed. The defence of the Electricity Commissioners for their action is that they had only the one scheme before them, and not the one that was before Parliament. This shows the urgent necessity there is for the Bill introduced by Mr. Clarry (which will co-ordinate procedure in such a case as this) being passed promptly, if gas undertakings are further to assist in serving the community by bringing to bear upon the supply of electricity in suitable areas the facilities and economic advantages they can offer. It is opposed to the public interest (where electricity is required) not to have the supply that can be made available in the most economic manner. The Lords Committee were manifestly of this opinion, inasmuch as they passed the Gas Company's Bill, on the condition that the works were completed to afford a supply in the compulsory area within twelve months from the date of Royal Assent. If the Bill succeeds throughout the rest of its Parliamentary journey, the Horley Gas Company will fulfil without question the obligation imposed upon them.

Gas Fires and Carbon Monoxide.

The attack from Salford on gas-fires owing to supposed carbon monoxide emanations from them into the air of rooms, and thence into the systems of the occupants, has had no effect upon the rate of the growth of popularity of this means of heating. "The proof of the pudding is in the eating;" and new connections prove a wholesome appreciation of the virtues of gas-fires on the part of the public through experience of them. The traducing of those virtues, however, demanded an authoritative research into the matter to confirm or refute the allegations; and this we find has been made by Dr. Leonard Hill, F.R.S., and Mr. T. C. Angus, D.F.C., of the Department of Applied Physiology, National Institute for Medical Research. The results were communicated to the "British Medical Journal;" and, by the courtesy of Dr. Leonard Hill in complying with a request we made to him for permission to reproduce the communication, we are able to give it in later columns. The authority of the experimenters and the results of the severe research will completely set at rest any alarm which may have been occasioned by statements, unsupported by acceptable evidence, as to the probability of chronic poisoning from the inhalation of carbon monoxide escaping from gas-fires, and will thus assist in the work that is being done to clarify the air, and to give an adequate supply of health-yielding ultra-violet rays. It will be noticed that these authorities assert that "carbon monoxide has no poisonous effect other than that of combining with hæmoglobin, and depriving the tissues of oxygen."

In the experiments a standard solution of hæmoglobin was used in a test tube; and the tests were so arranged that air was drawn from the neighbourhood of a gas-fire—a 12-in. one of modern type, used at full capacity. The results of the crucial investigation leave no room for doubt as to the positive immunity of users of gas-fires with flues from risk of carbon monoxide. The experimenters did not rely on a single test or a number under the same conditions, but carried out several in different circumstances. In the first one, air was drawn from the neighbourhood of the gas-fire, and during an hour 760 litres of air travelled over the standard hæmoglobin solution. No perceptible alteration resulted in it. A fresh introduction of the solution was made; and the experiments were continued for another eighty minutes. No change occurred after 1304 litres of air had been drawn over the solution. Thus, in two hours and twenty minutes, more air from the neighbourhood of the gas-fire was passed over the solution than a man would breathe. Air was also bubbled through the solution, with the same results. Further, air was drawn from the proximity of a gas-fire in another room; and there was no indication of carbon monoxide. No evidence of its presence was secured on a windy day. A further experiment was with a gas-fire arranged in the grate of an ordinary open fireplace. Again no evidence of carbon monoxide was found. Other still more severe tests gave negative results. Four flueless stoves placed in a small room with doors and windows closed revealed how little is the amount of carbon monoxide from bunsen flames burning in modern gas-fires.

The tests completely confirm that from modern gas-fires with flues there is no escape of carbon monoxide into the room; but the experimenters held, and there will be general concurrence, that no flueless gas heating stoves should be used in "sealed-up places" where natural ventilation is almost *nil*. In such cases gas-fires with flues should be employed. The tests being of such a severe and delicate character are highly valuable. The full details will be found in the article in later columns.

Powers under the Public Utility Companies (Capital Issues) Act, 1920.

The Public Utility Companies (Capital Issues) Act of 1920 expires on May 20; and the question of the position of companies who have unexercised powers under it has been raised. There has been a division of opinion as to whether those powers may be exercised after May 20. Some have thought they may; others have been of the contrary opinion. The weight of argument is distinctly on the side of the latter. The National Gas Council have to be thanked for placing a case before Counsel and obtaining an opinion against which, it seems to us, it is impossible to advance any argument which would have any validity. The Act had a duration of five years from its Royal Assent; and therefore it may be considered that the Legislature regarded this as the period of stringency, and that the powers they specially conferred should be consummated within that period to be effective. It is obvious that, if the obtaining of the consent of the Board of Trade to the issue of capital under the Act permitted the power to be exercised for an indefinite period, some gas company administrations might deliberately have secured consent for the purpose of over-riding the Special Acts of their undertakings for a longer period than the prescribed quinquennium. Whatever has been completed within the period of five years from the passing of the Act cannot possibly be affected; but whatever has been left undone cannot, in Counsel's opinion, be completed—there must be reversion to the powers under the Company's Special Acts or Orders. In other words, though the consent of the Board of Trade has been obtained, after May 20 the power to do the things to which the Board have consented will have gone. The consent is not the authority for carrying out any of the operations. The Act is the authority; and the Act will on May 20 have run its course. Even though there has been a passing of a resolution by the proprietors to issue capital in accordance with the consent of the Board of Trade, if the capital has not actually been issued at the time the Act expires, all further procedure is arrested by that fact. Counsel is of opinion that the Legislature did not intend to enable companies by these simple expedients to free themselves from the conditions of their Special Acts for an indefinite period. But all that has been done and completed within the terms of the Act during its effective life will continue to be valid. In the case submitted to Counsel, the important question was asked: "Whether, for the purpose of redemption of stock "actually issued as redeemable stock, the company is at "liberty to rely upon the terms of resolution passed "before the date of the Act by which redemption does not "take place until a later period when the Act has ex-"pired?" The reply is: "In my opinion, if the resolu-"tion so provides, the new stock which may be created "and issued to provide money for paying-off the stock "created and issued under the resolution or to provide "substituted stock may be issued as redeemable."

Coal Costs and Output.

The meetings of the Joint Committee of coalowners and miners at which an investigation is being made of the economic conditions of the industry are being held in private; but there is sufficient information published at the close of the conferences to indicate the course of the research. It should become clearer and clearer to the miners' representatives, if it was not sufficiently plain before, that they are responsible to a very large extent for the handicap that has been put upon the British coal industry in comparison with other countries which are growing, or have already grown, into serious competitors of our coal in the markets abroad; and this has a very grave effect upon requirements from British collieries, and therefore upon prices. The very position of the economic conditions of the British coal industry to-day is an invitation to the producers and users of coal in other countries to avoid British coal. Hence the closing-down of the less remunerative pits in this country, and the increasing number of unemployed men, regarding whom there must be a discount from the number when comparison is made with pre-war conditions, seeing that fewer were then employed for a larger output. The last conferences which have been held have been particularly directed to comparisons of costs of production and the outputs per man-shift in this country, on the Continent, and in America, as well as with the similar data for 1914. All through the piece, this country is showing to greater disadvantage in contrast with the statistics from other countries. We have here in the mining industry the shorter working day of seven instead of eight hours, which has had a considerable effect upon the output per man-shift. Furthermore, the wage rate is higher in this country than in others; and, owing to these conditions, the cost of production per ton has about doubled in the years since the commencement of the war. What may seem anomalous is that, in the coal areas where payments to the men are highest, the wage cost per ton is the lowest. This is entirely due to the effect of greater output per man-shift. It is, therefore, perfectly obvious that a vital factor in the cost of production is the man-shift output. The comparisons are proving in every way that British coal is very seriously handicapped in foreign markets through the higher output and the lower cost of production in countries which are in competition with us. Yet singular to state, with these plain facts before them, the miners' representatives decline even to consider the question of increasing the statutory seven-hour day, in order to augment the output per man-shift, and thus do something towards placing the British coal industry in a better position. What they would prefer to achieve is to shorten the hours of work and increase the rates of pay of the miners in Germany, with a view to ruling out the advantageous position occupied by German coal through the larger production at a lower cost per shift. That is an ideal, however, regarding which the German people would have something to say; and they are not likely to agree to their lines of policy in this matter being dictated by the Miners' Federation of Great Britain solely to bring about a competitive equality. Of course, another matter which affects adversely the cost of coal in this country is the increased railway freightage. Figures which have been placed before the Joint Committee show advances ranging from 50 to 88 p.ct. above pre-war rates. The investigations by the Committee are not yet complete; and therefore the Federation have decided to defer a further delegate conference to consider the wage programme and the ending or amending of the existing agreement.

Wembley.

The British Empire Exhibition will be opened on Wednesday, May 6.

"Waste Heat" or "Surplus Heat."

It is contended by Mr. A. Hugh Seabrook that to call heat "waste" which can be put to profitable use is a "terminological inexactitude." What has been known as waste heat on gas-works he contends is heat that has been wasted before it became to be applied to the raising of steam; but as it then comes into account, and increases the thermal efficiency of the gas-works processes, it can no longer be named waste. His view is that "surplus heat" would be a better name for heat which can be usefully applied.

Fixing of Geysers.

The present position regarding the controversy between the National Gas Council and the Metropolitan Water Board as to the fixing of geysers, points to the probability, as no satisfaction can be obtained from the latter, that it will be found desirable to inform the Water Board forthwith that the Council intend advising the Ministry of Health of the Board's refusal, and asking for an inquiry to be held.

Fuel Conservation and Electricity Supply.

The Industrial Group in the House of Commons are considering the question of the proposals for the development of electricity supply in the country; and they have appointed a Committee to go into the matter during the forthcoming parliamentary recess. It is stated that the Ministry of Transport have not yet received the report from the Committee presided

over by Lord Weir; but the problem is one of such complexity and difficulty that the Government do not expect to be able to deal with it this session. The Committee of the Industrial Group ought to have available information as to the power question being a larger one than is covered by electricity supply; that the conservation of coal and the co-ordination of the use of fuel supplies come into its scope; and that the gas industry occupies a place in the matter of power and heat provision, and can and does render important service in this connection and offers opportunities of national advantage, which should not be ignored by any responsible body of legislators.

Which Flicker?

The Paddington Borough Council seriously devoted time last week to a proposal that a Committee should be appointed to consider and report upon the question as to whether it would be a convenience to the public of London if the electric light were made to flicker for an instant at nine p.m. The idea emanated from Sir John Ramsay, who said a time signal of the kind was a feature of life in a town in South Africa where he used to reside. The impossibility of synchronizing a flicker all over London was pointed out. One of the Aldermen wanted to know how the right flicker would be recognized, because the electric lights in his house flickered all night. There was laughter. The idea was rejected.

Low Gas Coke Shipments.

There has been a large decline in the shipments of gas coke. The quantity exported in February was 41,714 tons, which realized £63,807, or an average of £1 10s. 7d. per ton. In February of last year, 105,227 tons were sent abroad; and in the same month of 1923, 106,233 tons. The values were: 1924, £183,323; 1923, £152,927. Taking the two months of the year, the exports amounted to 105,520 tons; the value being £163,685. In the corresponding period of 1924, 249,629 tons were shipped of a value of £432,653. The figures for 1923 were 200,688 tons; and the value £284,164. The metallurgical coke trade has also experienced a marked fall. The exports last month amounted to 102,083 tons, as compared with 156,142 tons in 1924, and 146,662 tons in 1923. In the two months of the year, the shipments of the metallurgical variety were 240,169 tons; 1924, 420,395 tons; 1923, 327,513 tons—the values being respectively £326,111, £844,172, and £529,280.

Exports of Tar Products.

Less benzole continues to leave the country. The quantity exported in February was down to 2252 gallons, as compared with 223,429 gallons in February, 1924. In January and February, 62,480 gallons was the total shipped; and this compares with 239,503 gallons in the corresponding months of last year. Of naphtha 5019 gallons were sent abroad last month, as against 31,628 gallons in February, 1924. In the two months only 7432 gallons were shipped, as contrasted with 45,159 gallons in 1924. Compared with January, February saw a large increase in the shipments of tar, oil, creosote, &c.—the figure being 4,097,259 gallons, compared with 1,640,009 gallons in February, 1924. The total for January and February was 7,765,666 gallons, which is more by 486,216 gallons than in the same two months of 1924.

Sulphate of Ammonia Exports.

In February, 27,975 tons of sulphate of ammonia were sold for overseas use, as compared with 24,648 tons in February, 1924. Taking January and February together, 60,409 tons were exported, as against 60,937 tons in the corresponding period of 1924. In the two months this year, Spain and the Canaries have been the best customers with 21,425 tons, compared with 12,784 tons in 1924. Japan comes next with 12,282 tons, but in the same period of last year that country bought 24,206 tons. The Dutch East Indies was in the two months a buyer to the amount of 10,519 tons, which is nearly 3500 tons better than in the same period of last year. The markets fluctuate, but the total for the two months (as seen above) is only about 500 tons behind 1924, which is a difference that may in a period of two months easily occur in business and shipments abroad.

Labour Alliance.

The scheme of the Miners' Federation for an alliance between themselves, the engineering, railway, transport workers and other unions does not appear to be making rapid headway. Discussions are still proceeding; and later on there is to be a combined conference of all the unions. One difficulty is that making common cause to support the programmes of some of the unions would inflict injury on the industries that give the members of other unions employment. However, even that firebrand, Mr. A. J. Cook, the Secretary of the Miners' Federation, says he will be no party to leading the miners out alone. The Industrial Secretary of the National Union of Railwaymen (Mr. C. T. Cramp) says he will not be prepared to enter into any binding alliance without the full consent of the rank-and-file. He is wise. Schemes which emanate from the Communists should be scrutinized with the utmost care in order to ascertain to where they may lead, if accepted. We are inclined to think—in fact, we know—there are many members of trade unions who resent the influence the Communists are wielding in the policies of their organizations.

PERSONAL.

The General Managership and Chief Engineership of the Commercial Gas Company.

In consequence of the responsibilities arising out of the death of his father, the late Mr. H. E. Jones, Mr. Stanley Hunter Jones, M.Inst.C.E., has resigned his position as Engineer and General Manager of the Commercial Gas Company as from the 30th inst. The Directors of the Company have elected Mr. Jones to a seat on the Board as from May 1 next, and have appointed Mr. Frederick John Bradfield, F.C.I.S., the present Secretary and Accountant, to be General Manager and Secretary, and have also appointed Mr. Archibald Edgar Williams, A.M.Inst.C.E., at present Works Engineer of the Stepney Station, to be Chief Engineer of the Company.

This month Mr. John Bond, O.B.E., completes 21 years' service as Manager and Engineer of the Southport Corporation Gas-Works; and in honour of the event a series of presentations was made to him last week. On Wednesday the staff and men at the works paid their tribute; and on Friday the staff and men of the distribution department made fitting recognition of the occasion. At the works gathering there were about 100 employees present. Mr. T. Cook (Deputy Engineer) occupied the chair, and was supported by Alderman E. Trounson, J.P. (the Chairman of the Gas Committee), Councillor J. E. Hindle (the Vice-Chairman), Mr. T. Halsall (Commercial Assistant), and Mr. Russell Johnson (Chief Clerk). Mr. Cook, Mr. Halsall, and Mr. Johnson had acted as Chairman, Secretary, and Treasurer respectively in getting together the necessary funds for the presentation. The Chairman said the meeting had been called that they might all have the opportunity of showing their appreciation of their Chief. The technical staff fully appreciated that Mr. Bond was always ready to give a hand to the junior members, to assist them to rise to the higher rungs of the ladder. The men who had left their works to take up senior and junior appointments in other works owed their all to Mr. Bond for his valuable help. They were very pleased to have Mrs. Bond with them that afternoon, and he was sure she must feel very proud of the occasion. Mr. Halsall reported that he had received telegrams of congratulations to Mr. Bond from the following gentlemen who had previously served at Southport under him: Mr. J. E. Blundell (Gas Engineer, Carlisle); Mr. S. E. Whitehead (Assistant Gas Engineer, Portsmouth); and Mr. Leslie Smith (Assistant Gas Engineer, Macclesfield). Mr. Russell Johnson made the presentation; the gifts consisting of a gold fountain pen engraved, a smoker's cabinet, and an attaché case. Mr. Johnson congratulated Mr. Bond, and assured him of the good feeling that had prompted the gifts. Alderman Trounson declared that he never envied a man more in all his life than he did that afternoon. Mr. Bond had that which all men prized beyond money. Mr. Bond said he felt overwhelmed with his reception. He appreciated greatly their friendship, and sincerely thanked them for the lovely presents. Mr. Philip H. Christian (Outdoor Superintendent) presided over the second function, at which, after further interesting speeches, Mr. Samuel Rigby (the oldest employee of the distribution department) asked Mr. Bond's acceptance of a choice dinner gong. Mr. Bond acknowledged the very handsome present.

The Directors, staff, and employees of the East Hull Gas Company have presented Mr. Boswell George Jalland, J.P. (the Chairman), with a suitably inscribed gold cigarette box, as a mark of their esteem and goodwill, on his completion of

fifty years' service as a Director of the Company. The presentation was made by Mr. George Taylor, one of the oldest employees, who was supported by Mr. Richard Nelson (the General Manager and Engineer) and Mr. Charles M. Jackson (a Director) in voicing the affection and esteem in which the Chairman is held by all. Mr. Jalland expressed great pleasure in the cordial relations which have always been maintained between the Company and the employees.

Mr. John W. M'Lusky, Engineer and General Manager of the Glasgow Corporation Gas Department, and Mrs. M'Lusky, are sailing from Glasgow, on the 24th inst., by the C.P.R. s.s. "Mountlaurier" for the United States. Mr. M'Lusky will visit upwards of a dozen important gas undertakings, and finish in New York, where he will, if arrangements are fulfilled, meet Mr. L. Hislop (late of Uddingston), who is on a world tour with his wife and daughter. It is expected that the party will return together to Liverpool in the s.s. "Adriatic," *ex* New York June 20. All good wishes for an informative and beneficial tour.

Newly elected members of the Society of Chemical Industry include Mr. Frederick J. Bywater, of Alnmouth, Northumberland; Mr. Frederick C. Bishop, of the Blackwell Colliery Coke Ovens, near Alfreton; and Mr. Frederick T. Hatswell, Mitchell Main Colliery Coke Ovens, Wombwell.

At the recent annual meeting of R. & J. Dempster, Ltd., of Manchester, it was decided to appoint additional Directors to the Board. Mr. H. S. Knight, General Manager, Mr. J. W. Scott, Outside Chief Engineer, and Mr. W. R. D. Perkins were elected.

Mr. R. G. Luxon, Engineer and Manager of the Launceston Gas Company, is shortly vacating that post in order to take up an appointment in Guernsey.

Mr. John Whitaker, who has just retired from the post of Indoor Superintendent of the Bradford Corporation Gas Department, after over forty years' service, and has been the recipient of various presentations from the Gas Committee and his colleagues in the department, was last week made yet another presentation, this time from the members of the Bradford Municipal Golf Handicap. It was a solid silver flower vase, and the function was presided over by Mr. E. J. Sutcliffe, Deputy Gas Engineer, who, like Mr. Whitaker, is a keen golfer. The presentation was handed to Mr. Whitaker by Chief Officer J. Scott, head of the City Fire Brigade.

Mr. R. B. Hodgson, of Stockton, has joined the Board of the Whessoe Foundry and Engineering Company, Ltd., of Darlington, and been appointed Managing Director. Mr. Hodgson is well known in the gas industry and in general engineering circles of this country, and has for some years been Director and General Manager of Messrs. Ashmore, Benson, Pease, & Co., Ltd., of Stockton-on-Tees.

Mr. W. E. Brock, late representative for Messrs. James Milne & Son, Ltd., has joined the staff of the Wellington Tube Works, Ltd., of Great Bridge, Staffs., as Outside Representative.

OBITUARY.

A most impressive funeral marked the interment on Saturday last of Mr. Henry Ellison, founder of the firm of Henry Ellison, Ltd., well-known in the gas, chemical, mining, and allied industries. Seventy-seven years old, the deceased gentleman was in his customary good health up to last week, when he had a seizure. A man of remarkable business judgment, Mr. Ellison founded or assisted many enterprises, in addition to his own firm, which was started in a humble way in Cleckheaton. Among many concerns with which Mr. Ellison was prominently associated, mainly as Chairman of Directors, were the following Gas Companies: Royston, Brodsworth and District, Beighton, Dinnington, Maltby, Bawtry, Whitwell, and Thorne.

The death took place on April 4, at the age of 77, of Mr. William Corbett, of Cherry Lea, Bromsgrove. At the time of his death he was a Director of the Bromsgrove Gas Company.

Mr. A. B. Beetles, Outdoor Superintendent at the Lytham-St. Annes Corporation Gas-Works, died suddenly on April 3.

Sympathy is extended to Mr. J. P. M'Crae (Assistant Engineer to the Derby Gas Light and Coke Company), who has had the misfortune to lose his mother, who was the widow of Mr. John M'Crae, for some time Engineer and Manager to the Dundee Gas Commissioners. Mrs. M'Crae died at her residence, "Rosemount," Crail, on the 26th ult.

Southern Association Bournemouth Visit.—We learn from the Hon. Secretary (Mr. H. C. Smith) that the visit of the Southern Association of Gas Engineers and Managers to the works of the President (Mr. Philip G. G. Moon), at the invitation of the Chairman and Directors of the Bournemouth Gas and Water Company, will take place on Friday, June 5. A joint meeting of the Districts will be held the previous afternoon in the same town.

THE COKE COMPETITION.

One Thousand Pounds in Prizes.

The full particulars of the Coke Competition appeared in our issue for Feb. 18, together with the conditions, and explanatory and editorial articles. The £1000 to be distributed in prizes has been placed in the hands of the Editor of the "Journal" by the Woodall-Duckham Companies, solely with the view of developing the interests of the gas industry by accumulating all knowledge, results of research, and suggestions which will assist in raising the status of coke, qualitatively and commercially. With this act of generosity, the Companies referred to retire from all participation in the organizing of the competition or in adjudicating upon the papers which will be submitted. The whole matter was at the outset placed completely in the hands of a Committee, composed of Mr. A. W. Smith, General Manager and Secretary of the Birmingham Corporation Gas Department, Mr. W. B. Leech, Engineer of the Beckton Gas-Works (Gas Light and Coke Company), and the Editor of the "Journal" (Mr. A. F. Bezant).

Briefly it may be stated that the competition is divided into three Sections:

COKE PRODUCTION.

SECTION I.—A paper dealing with the Manufacture of Coke of the most suitable qualities for Domestic and Industrial Purposes; as far as possible including the Cleaning and Blending of Coals, or Coals and Coke, their Carbonization, and the Quenching of the Coke—due regard being paid to the economic requirements of gas production and the value of the other secondary products.

COKE PREPARATION.

SECTION II.—A paper on Coke Preparation, to include Screening, Grading, Conveying, and Storing of Coke.

SALE AND UTILIZATION OF COKE.

SECTION III.—A paper on the Sale, Distribution, and Use of Coke, both for Domestic and Industrial Purposes, at Home or Abroad.

The papers must be separate for each Section, but any competitor may enter for one or more Sections.

PRIZES.

The following Prizes will be awarded:

SECTION I.		
First Prize	£200	
Second Prize	75	
Third Prize	50	
Twelve Prizes of	10	each.
SECTION II.		
First Prize	£100	
Second Prize	50	
Third Prize	25	
Ten Prizes of	10	each.
SECTION III.		
First Prize	£100	
Second Prize	50	
Third Prize	25	
Ten Prizes of	10	each.

The competition is open to the men of the gas industry of the whole world, and to others who have anything valuable to say—always bearing in mind that gas is the staple commodity of the industry. Thus there is no restriction as to competitors. Those to whom the prizes may not appeal, but who have anything of value which they can contribute, the Committee earnestly ask them to do so in the interests of the industry, the highest welfare of which all associated with it in responsible positions should have at heart.

There are rules to be observed in submitting papers; and they will be found clearly set forth in our issue for Feb. 18.

If any further information is required regarding the competition, a letter addressed to the Editor of the "Journal" will secure it, providing the points are specified on which the additional particulars are desired.

Riveter for Holder Cups.—The Hanna Engineering Works, of Chicago, have recently placed upon the market a riveting machine designed specially for use in connection with gasholder cups, which consist of a channel and two plates—one wide and one narrow. The plates are riveted on the flanges of the channel. The cup section itself is a cumbersome piece; and the riveter being the easier of the two to handle, is used in portable form. The riveter should be as light as possible, and with this in mind a special frame was developed known as the "true truss design." The machine has a 42-in. reach, and a 12-in. gap. The cylinder diameter is 10½ in., and it is capable of exerting 30 tons on the dies at 100 lbs. air pressure. In this machine is incorporated the Hanna patented mechanism, which develops a predetermined pressure uniformly throughout the last half of the piston stroke, or the last ½ in. of rivet die travel.

SAFETY OF GAS FIRES IN REGARD TO CARBON MONOXIDE.

By Leonard Hill, M.B., F.R.S., and T. C. Angus, D.F.C.
(From the Department of Applied Physiology, National Institute for Medical Research.)

[Published in the "British Medical Journal," and reprinted by permission of Dr. Leonard Hill.]

At times alarm has been expressed in connection with the use of gas fires as to the probability of chronic poisoning arising from inhalation of carbon monoxide. In a pamphlet published recently by a medical officer of health of a large city, and circulated at the recent Smoke Abatement Conferences, this view was put forward definitely, but without supporting evidence.

We thought it worth while, then, to carry out a few experiments to see whether we could put this fear at rest and remove any antagonism against the wider use of smokeless fuel which is necessary in order to secure freedom from smoke pollution of the air and an adequate supply of the health-giving ultra-violet rays. Carbon monoxide has no poisonous effect other than that of combining with hæmoglobin and depriving the tissues of oxygen.

Blood taken and diluted to 1 in 200 parts of distilled water afforded a standard transparent solution of hæmoglobin. When placed in a narrow test tube of the Gowers-Haldane hæmoglobinometer and viewed against a white background by daylight, it appeared yellow-red, as is characteristic for this dilution and width of containing tube. Saturated with carbon monoxide by shaking with coal gas, the tint of the solution under the same conditions is carmine. Partial saturations vary from the yellow-red very slightly tinted with pink up to the full carmine colour.

Experiment 1.—A balloon was filled with a measured volume of air by means of a blower fan and meter, and enough coal gas introduced to give 1 in 1000 parts of air. A sufficiency of the standard solution of haemoglobin was placed in a tube 6 in. long and 1 in. in diameter, which at each end was closed by a cork through which a narrow tube was inserted. The tube was held horizontally so that the solution of haemoglobin lay from end to end along its floor exposed in a shallow layer to air above, which was drawn through the tube in a steady stream through the narrow tubes, one of which was connected to the balloon, while the other was suitably attached to a suction fan driven by an electric motor. During half-an-hour 670 litres of air from the balloon was drawn over the haemoglobin solution. On comparison with the control solution (kept in pure air) this solution gave a just perceptible change in tint, indicating a very slight formation of carbon monoxide haemoglobin.

Experiment 2.—Two parts of coal gas per 1000 of air were then put into the balloon, and the experiment was repeated. After thirty minutes a slight but quite definite carmine tint was clearly seen on comparison with the control.

Experiment 3.—The experiment was now arranged so that air was drawn from the neighbourhood of a gas fire, a position being chosen where a person's face would be who sat down by the side of a fire in order to warm his legs. The gas fire, 12 in. wide, was of the modern type and properly flued, being built into a chimney, and was turned full on. During one hour 760 litres of air were drawn over the standard haemoglobin solution. No perceptible change in tint resulted. The solution was reintroduced, and the experiment continued for another eighty minutes. No change in tint resulted after 1304 litres in all had been drawn over the blood. A resting man breathes on the average about 6 to 7 litres of air a minute, or the above amount in a little over three hours. More air was, then, drawn over in the two hours and twenty minutes' observation than a man would breathe.

Experiment 4.—An experiment was arranged so that air, in place of being drawn over, bubbled through the standard haemoglobin solution contained in a flask. In this case the rate of ventilation was about 150 litres an hour. The air was drawn from the neighbourhood of another gas fire of similar type and properly flued, but in a different room. No indication of carbon monoxide escaping into the room was found in this case.

Experiment 5.—This experiment was repeated on a windy day, when possibly there might be some down-draught in the flue. No evidence of carbon monoxide was obtained.

Experiment 6.—The experiment was repeated on a gas fire arranged in the grate of an ordinary open fireplace; the fumes from the fire escaping up the open chimney above the fire. No evidence of carbon monoxide escaping into the room was obtained.

Experiment 7.—The experiment was repeated with this variation, that a door adjoining the gas fire was set open to create a draught between door and window across the neighbourhood of the fire. The result was negative.

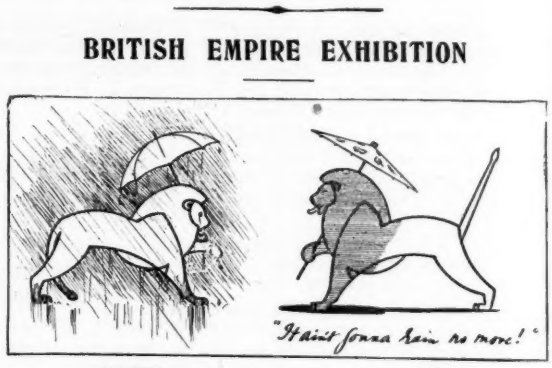
Experiment 8.—The experiment was repeated and varied by placing a small electric fan to blow across the gas fire to where the inlet to the sample tube lay. The fan blew across the warmed strata of air which lay in front of the fire, and this warm air was perceptible to the face when placed near the inlet tube, and gave one at once a stuffy feeling. No evidence of carbon monoxide escaping into the room was found even in this extreme condition of artificial side draught, which might be expected to blow fumes into the air.

Experiment 9.—To make the conditions as severe as possible, four *flueless* gas stoves of various types were placed in a small room about 12,000 c.ft. in capacity, and the door and window closed. The stoves were lit, and a mouse was placed on the table in the room. After two hours the temperature of the air at head level was 100° Fahr. dry bulb, and 87° Fahr. wet bulb; and on entering the room, one felt it at once stuffy. The mouse's blood showed 16½ p.ct. of carbon monoxide haemoglobin.

The difference between the inside and outside temperatures set-up enough natural ventilation through the crannies of door, window, and up the chimney to prevent very serious contamination of the air with carbon monoxide in this extreme case, showing how small is the amount of this gas arising from bunsen flames burning in modern gas fires. The touch of heated air to the face on entering such a room is unpleasant, while the breathing of the heated air, which contains traces of sulphur acids, congests the nose and gives a stuffy feeling. At the same time, cold feet may arise from the draught; cool air entering beneath the door. Gas fires should, then, always be properly flued.

No flueless gas burners or stoves should, of course, be used in *sealed-up* places where natural ventilation is almost *nil*. In such sealed-up places carbon monoxide may collect in dangerous amounts if cold surfaces are brought in contact with bunsen gas flames so as to check combustion.

BRITISH EMPIRE EXHIBITION



1924. **1925.**

The Wembley Exhibition is to be re-opened on Wednesday, May 6. So far as the Amusements Area is concerned, it will again be lighted by gas. Certain alterations have been made in the lay-out of the area. The positions of various buildings have been altered; but the gas standards, which are to be aluminium coloured this year, will be fitted, as previously, with Messrs. Staniforth's 16-light "Wembley" lamps, which proved so efficient last year. The positions of the lamps have not been changed; and the lighting will be practically identical with that shown during last year's exhibition.

With regard to the use of gas generally in the exhibition, practically the whole of the cooking at all the restaurants, cafés, &c., will be done by gas. There will be additional restaurants; and in these a very full gas equipment is being installed. Some of the other alterations which are taking place are: Larger supplies to Messrs. Carsons, who will be installing a Bonecourt boiler of considerably greater capacity; additional kitchen to Ceylon, where gas is being exclusively used for all hot-water and cooking; further supplies to British Guiana, and to Messrs. Barnand's, Messrs. Poppett's, &c., in the Palace of Industry, as well as to the Anglo-Indian section; and considerably greater supplies to Messrs. Baker Perkins, who are installing bigger ovens this year. A new service has been run to the South African exhibit, together with a number of other supplies in various places.

The original gas installation—including the 12-in. circuit main, with two station meters—still remains; and it is expected that the amount of gas used in the exhibition this year—subject, of course, to the prevailing conditions of weather—will be as much as, probably greater than, the requirements of 1924. All this apart from the Gas Exhibit, to which several references have appeared in the "Journal."

Coke-Oven Gas in France.

In a communication recently made to the Société de Chimie Industrielle, M. C. Berthelot draws attention to the fact that the French production of metallurgical coke, which amounts to about 3 million tons a year, corresponds to only one-quarter of the national requirements. The use of coke-oven gas for town use, he says, is therefore to be encouraged. He compares its use in France with that in Germany, where from 1903-21 the consumption increased from 500,000 to 31,000,000 cub.m.; in the United States, where the quantity has advanced from 607 millions in 1910 to 6075 millions in 1920; and in Belgium, where the towns of Brussels, Liège, Ghent, Mons, and Ostend are supplied wholly or partially with coke-oven gas. The gas should be purified before it leaves the works. The reason why this is not the present practice, he suggests, is because of the expense of oxide purification; and he thinks it would be better if wet purification was resorted to. The latter system is applied in 26 American installations for the daily treatment of more than 8 million cub.m. of gas. This process is to his mind an improvement—technically and financially—on oxide purification.

ELECTRICITY SUPPLY MEMORANDA.

Facts and Fancies.

The conferences on Electrical Salesmanship, as arranged by the Electrical Development Association, have ended for the present session. The last one was devoted to the consideration of a paper by Mr. R. Hardie, of the Glasgow Corporation Electricity Department, on the "Development of Electricity Supply in Residential Areas." In large part the paper advocated, relying upon recent experience in Glasgow, the adoption of hire-purchase for the wiring of houses. Although the electricity supply industry will not openly acknowledge the fact, they have had to resort—having obtained the easiest gained business—to countless methods for the purpose of influencing other people to adopt, even in a small way, the use of their commodity. This fact is rather a contradiction of the claims as to the pre-eminent virtues of electricity for domestic lighting and heating, though, as consumers well know, the really pre-eminent characteristics of electricity supply, particularly for heating and cooking, are the costs from installation to daily running. It appears that the main object in Glasgow of adopting the hire-purchase of wiring installations is to get in the thin edge of the wedge with lighting, and subsequently to attempt to effect the conversion of householders to the uneconomies of electric heating and cooking. Mr. Hardie says that in Glasgow they have calculated that the allotment of household expenditure in an average five-apartment house is £3 for electric lighting per annum, £6 for gas, and £10 for coal. We are obliged to Mr. Hardie for this allocation, in view of the fact that gas is only responsible for twice as much expenditure as electric lighting. Seeing that the application of gas in such a house is for cooking purposes and probably occasional room heating, and that the hotplate of the gas-cooker is very largely used for hot water provision, an expenditure of £6 a year, or 2s. 3d. per week, which is less than an average of 4d. per day, is something upon which we can pride ourselves, having regard to the extensive use which is made of the gas-cooker from early morning to last thing at night. The hotplate of the electric cooker would refuse to perform similar services without running away with a considerable amount of thermal energy. It is clear, too, that for electric lighting something like saturation point has been reached among householders who are willing to bear the cost of a wiring installation. Hence it is that it is necessary, in order to penetrate the strata beneath, for electricity departments to indulge in schemes whereby the wiring can be carried out by means of easy payments. The great difficulty in this connection is that even hire purchase will persuade but few tenants to adopt electricity, inasmuch as the wiring for which they are paying will, if in fit condition to be used when they leave the house, become the property of the landlord. Mr. Hardie describes this realization of new custom in fresh strata as "the problem" of obtaining new customers for lighting; and he admits that this is a most pressing task. We are not grieved to hear it.

Littleness.

To the reader there appears to be something pompous in Mr. Hardie's remark: "I have acted on the assumption that my work is to sell electricity without regard to the effect on the gas undertaking." How dreadful! We have not the slightest doubt that, without shouting it from the housetops, the men connected with the sales of gas in Glasgow are animated by precisely the same feeling of developing the sales of their commodity without regard or affection for the Electricity Department; and they are doing it. But we must protest against the remark of this electrical salesman: "Yet to-day, when electricity is at last beginning to live down the gross mendacious misrepresentation of the opposing vested interests and is making headway, there is a change of front impending." Mr. Hardie cannot know the history of things or he has been blind, or must possess an incapacity for discriminating between mendacity and truth if he does not know that the mendacity and slander that the gas industry formerly received from persons representing electric interests were such that even prominent men in that industry protested against the extravagance of language and claim. In addition to hyperbole, there is humour in a succeeding point which Mr. Hardie presents. He says: "If, as has been proved, gas need not for any purposes be laid into a modern dwelling-house, why incur further capital expenditure in laying gas mains and piping houses for a service which no one outside the gas industry will tolerate?" There was surely no occasion for the "if," seeing that Mr. Hardie is of opinion that gas is a service which no one outside the gas industry will tolerate. Did ever anyone read such rubbish, in view of the magnificent increases in gas consumption that the gas industry has been experiencing the last few years? These increases have not been obtained within the gas industry, but are produced by the patronage of the householding population of the country without identity with, or interest in, the industry in any way other than that of being glad to have the service of a labour-saving heating agent which is far more economical than anything electricity can offer them. Mr. Hardie's knowledge of even the elementary economics of the matter appears to be somewhat deficient. If this is the sort of thing that is to be presented at these Salesmen's Conferences for educational purposes, then it is a great pity, in the interests of an important industry such as that of electricity supply. These conferences are held under the auspices of the Electrical Development Association. We should like to know whether Mr. Beauchamp subscribes to the statements to which we have called attention. However, what the population of the country really thinks of the two commodities is well shown by Mr. Hardie himself, when he states that a year ago the Glasgow Electricity Department had 14,500 domestic consumers, while the Gas Department had upwards of 200,000 whose premises were lit by gas—electricity representing roughly 8 p.ct., with the average for London and the United Kingdom about 10 p.ct., or at most 15 p.ct.

The Scheme.

The wiring hire-purchase scheme outlined by Mr. Hardie has not been in existence many months. It offers to the householders the wiring of their houses with the payment spread over three years. It is explained in the paper that the majority of Glasgow people reside in what are known as tenement houses with, in each of them, eight to twelve possible consumers, who can be supplied from one service cable. Such a condition is naturally attractive from the supply authority's point of view. The Department's branch terminates at a point about 3 ft. from the entrance; and from there they endeavour to get the proprietor to instal a main rising cable to the top flat, complete with junction boxes on each flat, from which ultimately all the tenants may, should they so desire, obtain their supply. The usual cost of this work is £9. There the proprietor finishes his part. In the six months ending February, rising cables were installed at the proprietors' expense for upwards of 200 tenement houses, which means that facilities are now available for something like 2000 tenants "when they so desire." Of course, the interior wiring has to be carried out at the tenant's own expense; and there the trouble begins for the Department, in view of the fact that the tenant, being undecided as to his length of tenure, and disinclined to spend money on wiring another person's property, is not easily persuaded to incur the outlay. Nevertheless, Mr. Hardie states that, in the six months, 650 tenants have wired their houses, the majority of whom would probably not have done so in the absence of the scheme. Having regard to the population of Glasgow, Mr. Hardie acknowledges that this is an insignificant number, but he does not think it is altogether discouraging, having regard to the obstacles. In his opinion, too, it is probably correct to assume that the first 1000 consumers are the most difficult to obtain in a novel scheme. We do not think that is the common experience. Generally speaking, as has been found in connection with electric cooker installations, the first few hundred people who are attracted by novelty are easier to secure than subsequent hundreds; the tendency is for the new connections to tail off. As to tenant's cost: For a two room and kitchen house with five lights and two plugs for connecting electric fires (which can be hired), the price is £8 10s. if cash is paid, or £9 10s. if payment is spread over three years, in twelve quarterly amounts. For three rooms and kitchen, with six lights and two plugs for electric fires, the cost is £10 if paid in cash, or if spread over three years £11 6s. For four rooms and kitchen, with seven lights and two plugs for electric fires, the cost is £12 if paid in cash, or if payment is spread over three years £13 14s. These figures include cord pendants and lamps. If three-light or other superior fittings are desired, these are sold as an extra by the contractor. That is the scheme, and while we congratulate the Electricity Department on what has so far been done with wiring hire-purchase, it must be recognized that the conditions of Glasgow are not commonly found elsewhere; and it is very doubtful whether future experience as to the accretion of this class of custom will bring the same degree of satisfaction. Pretty certain it is that the class of tenants in these houses will not be able to afford much in the way of electric heating and cooking.

Which is the Jumpy Therm?

The Weymouth Corporation have been holding an electrical exhibition. The Gas Company have been doing some excellent propaganda work in the local papers and otherwise for their primary commodity. The electric exhibition is intended to be an answer to this. At the opening of the exhibition, some things were said which have to be proved; and a good many things were left unsaid, which shows discretion on the part of the electrical purveyors. The business propaganda of the Gas Company was referred to at the opening of the exhibition by Alderman T. J. Guppy, the Chairman of the Electricity Committee; and he attributes it to the "jumpy therm." A local newspaper in a headline alluded to the Alderman's "humour," which suggests that we ought to laugh over the "jumpy therm." Perhaps it will surprise the Alderman to learn that we did so, because it is positively certain that both the therm and the Gas Company's propaganda have given him the "jumps." Another matter over which we smiled was the omissions in his speech. One thing he did not tell the public was that it requires 29 units of electricity to equal the potential

heat energy in one therm. The price of electricity for heating and cooking in Weymouth has been reduced to 1½d. per unit; and the price per gas therm is 10d. Therefore, to obtain an equivalent amount of heat, 3s. 7½d. must be expended on electricity; as against 10d. for gas. Why did not Alderman Guppy state this? He might also have illustrated the matter another way. At 10d. per gas therm, 15,000 B.Th.U. can be purchased for 1½d. An electrical unit being equal to 3420 B.Th.U., 4⅛ units would have to be purchased at an expenditure of 6½d. to equal the potential heat purchasable for 1½d. by gas—in other words, 1½d. spent on gas will give 15,000 B.Th.U., as compared with 3420 B.Th.U. by electricity. The Alderman will see that in these differences there is an advantage on the side of gas which must give the Electricity Department violent "jumps" if they want to get hold of a substantial cooking and heating load; and the "jumps" would extend to the consumers when they received their accounts for current consumed for these purposes. When the good people of Weymouth consider those things which Alderman Guppy did not disclose to them, they will want to know what he meant by the words: "An exhibition of electrical energy for cooking and other things as come within the region of everyone." The passage is not happily phrased, and it is untrue. Also what was the justification for his saying: "We will leave it to the demonstrators to show you we can cook and give you other facilities in better form so that the people of Weymouth can enjoy the benefit of electricity." There is more to be learned by the user about electrical operation for any heating purpose than the mere employment of the appliances. Experience is apt to produce nasty shocks—of a monetary and time absorbing character. The appliances may be very fine to look at; but it is impossible to get more heat out of the electrical unit than it contains. Such generalizations as were used by Alderman Guppy in his speech do not prove anything.

Imitation.

Some electrical journalists ought to be on the staffs of papers which purvey frivolity of varied quality to their readers, rather than be associated with technical papers. Imitation, we are told, is the sincerest form of flattery. If this be true, then the writer of "Cooking and Heating Notes" in the "Electrical Times" thinks that compliments are being showered upon domestic electrical appliances by the gas rivals. Naturally, there has been interest and amusement in investigating what is said in support of this. It is found that the writer of the notes in question is as lamentably ignorant regarding the history of gas appliances as he is incapable of making proper comparisons between gas and coal heating, as was seen in our editorial columns on March 18, under the heading of "Electrical Arithmetic." Among the supposed feats of emulation he mentions the pneumatic gas switch, the gas "bowl type" fire, and the gas imitation coal fire. As to the last-named, they were on the market long before imitation electric coal fires were there, which are one of the biggest jokes ever played upon the public by an industry which seems to be fond of practical joking, and playfully calls it "business." As to the pneumatic switch and the gas "bowl-type" fire, these are merely instances of the large range of adaptability possessed by gas. But the writer in our contemporary, unfamiliar with the history of things, charges the gas industry, among its more recent efforts, with the enormity of being copyists in respect of the outside heating of ovens. This is really funny, seeing that some of the earliest types of gas-ovens were heated that way; and it must be twenty years ago now that externally heated gas-ovens were on the market, and some substantial ones were installed in hotels, clubs, and other places in London. But we must excuse the electrical novices in these matters if they in their eagerness and ignorance make mistakes of this kind. It may seem curious to our electrical friend that the public never took very kindly to externally heated ovens; and with all the silly talk of the electricians as to gas fumes, the public, with comparatively few exceptions, stick to the internally heated oven. The ignorant accuser of imitation says that gas has copied external heating with a view to secure the same hygienic conditions as obtain in electric cooking. Now what does he mean by that? The most unhygienic conditions in cooking are to be found in an unventilated oven, where meat is being cooked in an atmosphere saturated with its own emanations. This must be a particularly unhygienic state when the meat retains the flabby condition to be found in a closed oven with a supersaturated atmosphere, and an unusually low cooking temperature.

Further Piracy.

Then this vain pretender to knowledge has some idea that thermostatic control has been adopted to deal with the variations of heat due to fluctuations of pressure in the mains. Thermostatic control has been in use many years in connection with gas-heated hot water apparatus; and its application to ovens is simply an extension of service from one form of apparatus to another, but it is only found in certain modern superior types of gas cooker. The idea is not by any means to deal with the supposed fluctuation of pressure; but the control can be set to any desired temperature—giving a temperature range of incomparable value contrasted with electricity—and, when that is reached, the gas supply is maintained at a level which will ensure the same temperature continuing as long as desired, despite heat losses through radiation, conduction, convection, or variations of atmospheric temperature external to the oven. Really laughable is the colossal assumption which the writer in our contemporary possesses as to the copying there has been by the gas people of electrical apparatus. Really the boot is on the other leg. To the electric cooker he says may also be attributed the separation of the hotplate and grill from the oven. Such separate construction may be found illustrated in very ancient catalogues of gas-cooking apparatus. But worse still—electric competition is credited with "frantic endeavours" to improve the "appallingly" low efficiencies of the gas hotplates. Does this strangely imaginative individual suppose gas investigation and progress would have stood still had it not been for electrical competition? The most pronounced ninny is generally the man who thinks other men are simpletons. The efficiencies of gas hotplates were low formerly, but, bad as they were, they were superior to the efficiencies obtained on the hotplates of electric cookers. Modern gas hotplates are showing efficiencies that are 40 to 50 p.ct. better than the old ones. Electric hotplates if they show when new about 40 p.ct. efficiency are doing well—for such contrivances, which unfortunately show marked alacrity in departing on their downward career. And talking of efficiencies, it must not be overlooked that in London from 11,000 to 12,000 B.Th.U. can be purchased for a penny from the gas suppliers as against 3420 B.Th.U. from the electricity suppliers—where energy is 1d. per unit, which is not the case generally. More frequent figures are 1½d. and 2d. There are other suggestions as to "imitations" on the part of the gas apparatus makers, which are as unfounded as the rest of the childish assertions to which attention has been drawn.

WORKERS AWAKE!

A correspondent has called our attention to an article by Mr. J. L. Garvin in "The Observer" for March 29. It is headed "Sleepers Awake!" Our correspondent thinks it should have been "Workers Awake!" Mr. Garvin points out that the industrial question is our one business of life and death, and that we shall either settle it, or it will settle us. He is of opinion that a movement has begun which will shake us out of our inveterate conservatism and our false composure, and compel all interests, including the Government, to grapple with the national necessity for economic reorganization. The conferences between employers and workers that are now taking place are touched upon, as well as the revelations of the times. The large part that labour plays in the present disastrous conditions of industry, and the part labour will have to take if we are to retrieve our position, are shown; and then there is this paragraph on "Work and Wages" which our correspondent thinks should be published in the "Journal." It emphasizes points which have frequently been made in our editorial columns as to the interdependence of our industries, and as to the imperative necessity of the workers making their contribution to our industrial revival. There will be no substantial revival without. The paragraph reads:

> Upon the situation as it stands, the first day of the shipbuilding conference threw some fresh light. It proved that the problem lies as much outside the shipyards as in them. "Shipbuilding," as the Chairman (Mr. John Ball) put it very clearly, "is governed largely by the cost of coal, steel, and engines." The syndicated federations in Germany to-day organize economy upon every link in that chain. There are five main things that we on our side have to face. The first is the basic problem of the price of coal. The second is the want of consolidation in the iron and steel trades. The third is that our "sheltered trades," like transport, building, municipal service, and so forth, are enjoying by comparison a parasitical growth, exempt from foreign competition. They are forcing up costs at the expense of our main productive and competitive employments upon which all the rest will depend in the long run. The fourth factor is that the suicidal rigidity of trades union etiquette in this country, as in no other, makes it impossible for the British employer as a rule to equal his German or American rival in elastic and economical organization. The fifth and gravest point for our industrial democracy is that hours abroad are longer and wages less.
>
> Let us look at what is fundamental in these propositions. We do not believe that international legislation for a long period to come will be able to equalize wages by levelling-up, or hours by levelling-down. It is pretty certain instead that, unless the masses of the British nation make up their minds through and through that they must work harder, the standard of life and average prosperity cannot be raised again. All the professional classes, everywhere in Europe, have to work far harder than they ever did. The working classes will have to do the same if they are to achieve a better future and avoid a worse. Why is this an iron law? Why is there no escape from it? The answer is only too plain. We are doing less business in relation to our needs than ever before, except perhaps during the short severe phases of two or three commercial crises a hundred years ago. Yet we have a larger population. But the average output is not only less per man per day than it was before the war; it is positively less per man per hour. Foreign competition is wider and abler than ever before; and it is increasing.

NORTH BRITISH ASSOCIATION OF GAS MANAGERS.

SPRING MEETING IN EDINBURGH.

THE Spring Meeting of the Association was held last Friday afternoon, in the North British Hotel, Waverley Station, Edinburgh. Mr. JAMES CAMPBELL, of Dunfermline, presided; and he was supported at the luncheon by Lord Provost Sleigh (Edinburgh), Bailie Stewart (Convener of the Edinburgh Corporation Gas Committee), Councillor Gregorson (Sub-Convener of the Edinburgh Corporation Gas Committee), Dr. E. W. Smith (London), Councillor J. M. Smith (Convener of the Dunfermline Corporation Gas Committee), and Messrs. J. W. M'Lusky (Glasgow), J. W. Napier (Alloa), G. Keillor (Greenock), W. M. Mason (London), H. H. Gracie (Edinburgh), and John Wilson (Motherwell and Wishaw). Nearly 200 members and friends were present.

LUNCHEON.

The PRESIDENT, in opening the proceedings, said the meeting had always been a very popular one with members of the North British Association. He supposed that to some extent its informal nature conduced to this popularity. That day, however, they were honoured in having as their guests Lord Provost Sleigh and other influential members of the Edinburgh City Corporation. Lord Provost Sleigh was an exceedingly busy man, and they were gratified that he should find time to join them.

Lord Provost SLEIGH remarked that he was delighted to be one of their guests, and had thoroughly enjoyed their hospitality. His first duty was to extend to all members of the Association a very hearty welcome to Edinburgh. The Corporation were always delighted when such conferences were arranged. He felt that he must congratulate the gas industry, because it had held its own in a magnificent way against a very strong competitor—electricity. He had personally taken a very great interest in gas affairs ever since he saw the light. He wished the Association all success.

Mr. JOHN WILSON (Motherwell and Wishaw), proposing the toast of "The Guests," took occasion, on behalf of the Association, to thank Lord Provost Sleigh for his kind words of welcome. Associated with the toast was the name of Bailie Stewart, the Convener of the Gas Committee in Edinburgh. In mentioning the name of Bailie Stewart, he believed he touched responsive chords in the hearts of all the managers present, because it was well known how earnest and hard-working the Edinburgh Gas Convener was in everything pertaining to the welfare of the gas profession. Wherever there was a meeting connected with the gas undertaking, there they would be sure to find Bailie Stewart.

Bailie STEWART, in the course of a brief acknowledgment, said they in Edinburgh were glad to learn of the progress that was being made by the gas industry throughout the country. As against electricity, there was no doubt that gas was more than holding its own. Year by year the industry was increasing and prospering. From personal experience, he knew the high qualifications that were expected from a gas engineer and manager; and speaking from first-hand knowledge, he was in a position to say that the work of management was splendidly carried out all over the country. His best wish for the industry was that it would continue to grow and prosper, and that the present-day members of the Association would continue to carry on the good work that had been satisfactorily performed by their predecessors.

The PRESIDENT reminded them that they had with them Councillor Smith, of Dunfermline, who, on behalf of that city, was, he believed, to deliver a message that would prove most acceptable to the members.

Councillor SMITH said it gave him great pleasure to be with them, as a representative of the Dunfermline Corporation and the gas-works of that city. It was with great satisfaction that the Town Council of Dunfermline learned that Mr. James Campbell, their Gas Manager, had been appointed President of the Association for the present year. Of Mr. Campbell he could say that he would make a good President. Whatever work he took in hand was certain to be carried out well. He believed it was the custom of the Association to hold the September meeting in the town in which the President for the year was professionally engaged. When that point was brought before the Town Council, they unanimously agreed to ask the Association to hold the autumn meeting this year in Dunfermline; and he extended a most hearty invitation to the members to do so. He could assure them that the members of the Town Council would do what they could to make the visit interesting, enjoyable, and memorable.

The PRESIDENT said they would gladly accept the invitation to hold the September meeting in Dunfermline. Speaking for himself, he was highly gratified by the enthusiastic way in which the Gas Committee and the Town Council as a body had taken up this invitation.

Dr. E. W. SMITH (London), submitting the toast of "The North British Association of Gas Managers," asked if there was any reason why the gas industry, with all its status, power, and ramifications, did not have more influence than it had in quarters that counted in London and throughout the country. To his mind, the gas industry was one of the finest commercial organizations to be found anywhere for propounding what it could do. In spite of this, however, the industry did not seem to be very effective in creating an atmosphere which would make people say "Let us have gas;" whereas they were saying, without having any idea of what it meant, "Let us have electricity." This was a state of affairs that had to be put right. This could best be done if everyone associated with the industry would proclaim its virtues. In the gas industry they had something which would stand on its own feet without having to run-down any rival or competitor. The present gas industry was infinitely better than the gas industry of fifty years ago. As a matter of fact, they were only now beginning to realize the possibilities. They had heard from Mr. Lloyd George—and others who knew as much about the subject as he did—that electricity was the solution of all fuel problems. On this point, his personal view was that there were no men in this country—quite apart altogether from their practical knowledge—who were in a better position to get-down to the fuel problem, and to make practical suggestions as to the methods of handling fuel, than those associated with the British gas industry. Why were they not doing it? It was not sufficient to say, "Use gas, and do not use electricity." They had to get-down to a co-ordinated scheme which would include gas and electricity, and which would embrace fuel-oil and coke-oven practice. They must show that, by the co-ordination of all these things, it was possible to produce power and heat at a very much lower price than the cost to-day. They must strive to show that it was the unnecessary competition between all these things which increased the costs of power and heat. At the moment the Leeds University were turning-out some extraordinarily good men—men who would make their mark in the future, and some of whom were already making their mark, in the various undertakings with which they were associated. They wanted, however, more and more to get scientifically-trained business men in charge of their larger gas undertakings—men capable of taking broad views, and who could handle things in a scientific and business-like manner. If it was not possible by atmospheric means to produce ammonia in a big way, then it could not be produced by any method as cheaply as by the gas industry. They must stress points like this all the time.

COKE POLICY.

In this connection, he might ask Mr. Mason what was proposed to be done at Wembley this year in the matter of the display of coke. On the subject of coke, he personally had very strong feelings. Indeed, he felt it was true to say that coke was a neglected bye-product of the industry; and that, too, in spite of the fact that it was in reality its biggest asset. It could be made a very much bigger asset still. Recently it had been effectively demonstrated in many ways that properly-prepared—graded and reasonably dry—coke could be used for domestic purposes; and it was being employed very largely for these purposes, both in the Midlands and in the South. He was quite satisfied that there was not a gas undertaking in the country, with coke available for sale, where it would not pay to give this matter of its preparation and exploitation the fullest possible attention. If managers would undertake to grade the coke and keep it reasonably free from moisture, there would be absolutely no difficulty at all in getting rid of supplies. Indeed, on this aspect of the question, he was personally prepared to guarantee that, in any particular district—given always, of course, proper plant—it was possible to ensure a complete sale of all the coke for domestic purposes. There was no difficulty about that at all, if the subject were tackled in the right way.

The PRESIDENT, with whose name the toast was coupled, remarked that there was reason for congratulation in the progress made by the industry during recent years. There was much useful work for the Association to do.

THE WEMBLEY GAS EXHIBIT.

The PRESIDENT said that at this stage he might call on Mr. W. M. Mason, of the "B.C.G.A.," to report progress in connection with the Wembley Gas Exhibit.

Mr. MASON, at the outset, expressed thanks on behalf of the Wembley Gas Exhibit Executive for being afforded this opportunity of telling the members what it was proposed to do in regard to the present year's exhibition. He went on to explain that the decision that the gas industry should be adequately represented at Wembley in 1925 was come to after most careful consideration by a representative meeting, when it was felt that every opportunity—both by striking display and widespread advertising—should be taken to demonstrate to the public the universality of gas as a fuel for domestic and business purposes. Growing competition—supported, unfortunately, by not very carefully thought-out political backing—was trying to make the public think that gas was a thing of the past. The Wembley Exhibit last year, and the splendid Press publicity which it secured—and which it was hoped would be repeated this year—did a great deal to prove that the gas industry was very much alive. That the decision of the leaders to go on with a National Exhibit this year was wise, was proved by the fine financial support to the scheme which had been forthcoming. Scotland, as usual, was not behind. The subscription list included, to date, the following contributions, as well as many smaller ones. Indeed, some of the small undertakings had actually sent in subscriptions of double the amount asked:

	£		£
Glasgow	1410	Greenock	50
Edinburgh	262	Alloa	25
Aberdeen	50	Falkirk	25
Dundee	50	Dunfermline	75

Among the smaller undertakings, he was delighted to report

that Callander, Burntisland, Kilbarchan, and Stranraer were "doing their bit" in regard to the exhibit; while burghs like Airdrie, Dumbarton, Greenock, Kirkcaldy, and Hamilton had either already contributed or were about to contribute their share of the expense. Something had been said by Dr. Smith relative to the display of coke at Wembley this year. At the moment, he (Mr. Mason) could not enter into the details of that; but he could assure them that there was to be a substantial exhibit of coke. The uses of coke from the industrial and domestic points of view would be fully demonstrated.

MAINTENANCE OF DOMESTIC CONSUMERS' APPLIANCES AND FITTINGS—ADMINISTRATIVE POLICY OF GAS UNDERTAKINGS.

By J. W. Napier, of Alloa.

The past five years have witnessed successful efforts towards co-ordination of the affairs of the gas industry—the legislative and administrative side, for which the National Gas Council stands; the advertising of the merits of gas, for which the British Commercial Gas Association exists. Unity is the aggregate value of the individual effort in reaching a common objective. Individualism provides the initiative; but in an industry serving the nation upon a higher basis of economics of fuel supply and industrial products, organized effort is necessary. In this regard not only is advancement sought for, but protection also—advancement in creating a better public service for the users of gas; protection of the interests of gas undertakings, interests that are unselfish and are of communal value and national necessity. Consumpt of gas is an important factor in costs of manufacture and distribution. The continuity and progress of the gas industry is at the consuming end of the business. It is highly essential, therefore, with this clear outlook, to embrace a commercial policy securing business by good maintenance of consumers' appliances.

Having this outlook before us—namely, organized administrative policy—it appears to me that this Association, representative of the gas industry in Scotland, should determine a plan of gas distribution practice for the acceptance of individual corporation and company owned gas undertakings. The Association have the power of influencing the administrative affairs of gas supply, and of directing a new policy. There are problems that are the better for slow growth, before being put into general practice. Maintenance of consumers' appliances is now ready for general adoption. Hitherto, discussion of the duty of maintenance has circled largely round lighting appliances, and consideration has been given to the preserving of the lighting load. It is intended in this short communication to include the whole service of domestic gas supply, to consider the subject in its entirety, and to state conclusions setting forth a definite policy.

Service Pipes.

In the course of my relations with a large number of undertakings throughout the country, I have observed wide differences in practice. There is the case where the proprietor is required to provide and lay the entire length of pipe, the gas undertaking simply providing the street main; and the more common example of the gas undertaking meeting the cost up to the line of street, the proprietor paying for the pipe laid in private ground. There are cases where the gas undertaking provides the entire length of pipe up to, and including the fixing of, the meter, and instances where the cost of piping in private ground is divided between the parties. To apply a rule of strict obligation and equity among consumers, the policy of the cost of pipe from the street main to the line of private ground being met by the gas undertaking, and all pipe laid in private ground being paid for by the proprietor, is justified, and may be held as good practice. Capital cost, and not maintenance, is here concerned. There is a distinct feature in continuing with the proprietors of buildings the duty of first cost. It preserves equity. In similar circumstances all parties are treated alike. With the completion of the service pipe, the responsibility of the proprietor may be said to cease; that of the gas supply authority acting in the interests of consumers begins.

After considerable experience, and, in particular, after making observation of the results of divided responsibility, my settled opinion is that, immediately the service pipe has been completed up to the meter, the gas undertaking should take it over, and accept for the future full maintenance, including replacement when required. The added cost, one year with another, as and when repairs and renewals occur, will not in my view be considerable. Against the added cost, the gas supply authority has single ownership over the entire service pipe. Dual control and responsibility cease. That there should be dual ownership stultifies the position of the supplier of gas in the endeavour to give satisfaction. It acts and re-acts as between the mutual interests of gas supplier and user. The inadequacy of a large proportion of service pipes in almost every gas supply area is undoubted; that this must be so is evidenced in the maximum demand of to-day for cooking and heating compared with the maximum demand of a lighting load only, for which many service pipes now in use were originally laid.

The question will naturally be asked, What of the many service pipes existing under the old policy? The answer is clearly that they be taken over and cared for in the same way. Owners of property are not likely to entertain objections. The gas authority has obtained complete control, and is therefore in a position to preserve aright the pressure and volume of gas up to the meter. This is one of the objectives, and the policy is commended to the gas industry for its intrinsic merits and values. It should be stated that, under the system now projected, the specification of quality and size of service pipe for all new properties will be entirely under the direction of the gas supply authority. Let me say, finally, in regard to administrative duty, that there is no obstacle in the way of municipalities working under the Burghs Gas Supply (Scotland) Act, 1876, adopting complete control of service pipes. In the case of undertakings having special Acts, there may be lack of direct or implied authority; but this is a matter easily remedied. With private company undertakings, no difficulty whatever exists.

Cooking and Heating.

Dealing with piping for cooking and heating appliances comprising fires, geysers, wash-boilers, &c., the tendency is that the gas undertaking carries out the work free of cost to the consumer. In these instances, maintenance is accepted, and no difficulty arises. In cases where the consumer is charged in whole or in part for the fitting-up of cooking and heating appliances, it is suggested that control of the piping for maintenance should be accepted. This should be an easily accepted responsibility, as the fitting-up of installations, if not actually carried out by the gas department, is usually directed by its officials. When the practice obtains of leaving the fitting-up of apparatus to consumers, there is uncertainty as to proper size of piping to be employed. Such practice spoils control, and maintenance is made more difficult. It is as much the duty of the gas department to ensure proper size of piping as to sell or hire-out efficient apparatus. Where this policy of non-control is allowed to continue over the years, there is a multiplying of inconvenience and dissatisfaction of consumers.

The justification of a gas undertaking expending money on piping inside private houses is naturally a subject requiring consideration. The evidences in favour are that, in doing so, additional use of gas is obtained for expenditure already incurred for the service pipe and meter; the piping, being determined by the gas supplier, is adequate; and there is good workmanship. As a result, maintenance is accepted. In addition, where fixing free has been the practice, results have shown that a greater number of consumers take advantage, and therefore a larger volume of business is done. Part of the expense of fixing in cases where appliances are sold outright to consumers can be met by a percentage amount being added to the net cost of the appliance. The opinion is freely stated by officials that asking consumers to pay for fixing in many instances retards progress in the use of gas for cooking and heating. The experience of the writer, looking back over a considerable number of years, in fixing all gas apparatus free, is that there is no desire to depart from the practice. The result has shown a high aggregate consumpt of gas per household per annum, and a price of gas to-day of 2s. 6½d. per 1000 c.ft.—*i.e.*, the rate of 3s. 2½d. *less* 7d. for electricity deficit. There will be many differing characteristics with the many gas authorities, but the policy of free fixing completes at once the control and maintenance of piping in consumers' houses in the supply of gas for cooking and heating requirements.

The absolute need of maintenance of cooking apparatus and of gas fires and other domestic appliances need not be elaborated. There must always be in front of us the fact that gas, by simple reason of its not being a single element of heat, but a mechanical compound of gases, demands in its consumption regulation of supply and inspection and cleaning of apparatus. Maintenance includes free inspection and regulation—replacement parts being charged in accordance with the policy of the undertaking concerned. There should be no distinction whether the apparatus is private property or on hire. In cases where cookers, for example, are supplied free or on hire-purchase terms, the cost of replacement lies, of course, with the gas department.

What difficulties, practical and financial, are in the way, preventing or retarding the maintenance of consumers' fittings and burners? There are none. There are occasions when it is best to free oneself of difficulties by not observing them. It is unnecessary to repeat the evidences in favour of maintenance. A new general policy should be accepted by the gas undertakings in Scotland, to be put into practice within the next twelve months. The best protection for the lighting load is a policy of maintenance.

A constructive policy requires to be defined. The gas undertaking will undertake the work of maintenance of consumers' lighting appliances. The technical knowledge and experience of the gas supplier enable the work to be done in the most satisfactory manner. The education of the gasfitter is a permanent institution of the gas industry, and he is now a technical expert. The gas department may seek the assistance of local gas-

fitters, but this is a policy for each undertaking to decide for itself. The organization of the work must originate in the gas department. A definition of maintenance is required. The appliances to be maintained are those in use, whether privately owned or the property of the gas department. Consumers should be advised as to discarding out-of-date and inefficient burners. They should be supplied with suitable burners, &c., at charges to be determined by each undertaking. Only the actual material supplied should be charged. The scheme should embody free inspection and cleaning. Each undertaking should select, and control the supply of, burners of recognized merit. This requires combination with local plumbers and gasfitters.

As regards the payment of maintenance service, there is only the one source—namely, the price of gas. Arising out of the trend of opinion expressed in this paper is the matter of equity as affecting the various classes of consumer. In all business legitimate expenditure is placed on the cost of the article supplied. Allocation of value to consumers is determined by a differential scale of charges. This refers more especially to large industrial users who benefit by low rates on the basis of quantity used. Large users of gas for domestic purposes can be given a scale of discounts.

My endeavour has been to stimulate an interest in the subject of maintenance, in order to hasten the general adoption of a policy. Time was when a low price of gas was the one end and aim in selling gas. Price alone, with the present-day mentality of the public, is no longer the substantial deciding factor it used to be. To-day the position is altered, and service is an essential duty. It is hoped that unanimity will prevail on this subject. It will be understood that I have left to Mr. M'Lusky the question of costs of service.

MAINTENANCE OF CONSUMERS' APPLIANCES.

By George Keillor, of Greenock.

A study of the history of gas supply in Scotland teaches us that the maintenance of consumers' gas appliances is not a new question. Forty years ago (to go no further back) the question was under discussion; and in certain enlightened quarters it had, even then, become the custom not only to give away flat-flame burners, but to clean bracket taps and swivel joints, and do other odd jobs without charging the customer anything for the work.

Thirty-three years ago a paper was submitted to this Association by my father, entitled "How to Keep Down Complaints and Grumbling among Gas Consumers." The following quotations are taken from this:

"Let your meter inspector be a man of sound mind and judgment, thoroughly trained in the distribution of gas, and able to discuss with customers *on the spot*, in a courteous manner, everything connected with gas supply, to hear their complaints quietly, say nothing but what is absolutely necessary, and certainly never show the least ruffle of temper or any unnecessary independence; after which make it a point to quieten the grumbler by, if possible, removing the cause of his discontent. . . . I have come to the conclusion that the real and only cure for this epidemic of grumbling is that the meter inspector must deal with all complaints on the spot; but whatever means may be taken, or at whose expense, nothing must be left undone that, in reason, will satisfy the consumer. And whatever or by whom it may be done, let it be superintended by the gas official; for who has greater interest in the gas that is being sold than the man who makes it? And is it not obviously for the benefit of all gas companies and corporations to keep in their own hands, if not the whole control of all internal fittings, at least the entire superintendence of the alterations and improvements in gas lighting when opportunities occur? . . . I hold that every manager should provide his officials with a stock of new burners of all sizes, to be given to all and sundry. And all who occupy the office of meter inspector and collector—who may be the manager himself in small gas-works—should be men thoroughly practical, and not only able to discuss the different systems of gas lighting with consumers, but also be of a straightforward and courteous disposition, with a strong aptitude to do good business in a real business fashion. . . . I say: Please consumers, and do good business with them; and you cannot fail to satisfy your directors. . . . In the age we live in, the gas man's independence is not how much superiority he can show over others, but only the independence gained by being able to satisfy the consumer with his goods. . . . It may be asked, 'How can a meter inspector have time to deal with such matters when on his inspection, and how is it possible to satisfy every person?' In this question lies the whole problem. But it is a problem, I am convinced, it will pay to solve, and one which after all is not very difficult of solution. It would no doubt add a few days, or even a week, to the time in making the survey; but is it not a fact that this man is, by the aid of the meter, selling our stock? . . . Competition in lighting is increasing, as in everything else; and to please our customers, our representatives must be courteous, long-suffering, patient, and practical."

About 32 years later we find Mr. Arthur Coe, in his interesting book "The Scientific Promotion of Gas Sales," giving publicity to similar sentiments, and pointing out that the value of the meter inspector had too long been under-estimated.

The idea of the principle of maintenance and salesmanship was born in those distant days, and the various statements submitted this afternoon bring the subject up to date. They indicate very clearly the advance we have made in principle and opinion, and also in the actual practice of organized maintenance. The evolution of the idea has been slow; but now that a practical solution has been found and described, it ought to be adopted immediately and universally.

In my opinion the present-day solution of the problem lies in the regular free overhaul of all gas-consuming appliances. But at the same time we should use our utmost endeavour to promote and retain the goodwill of every citizen. It should also be our endeavour to seek out and multiply points of contact between our servants and the public. An organized system of public service, humanely designed and administered, does this; and if we consider it to be our duty to guide and instruct consumers in the safe and economic use of gas, the road to success will be all the easier. The Gas Regulation Act, in fixing the responsibility for the adjustment of consumers' appliances as required for the efficient use of the quality of gas to be supplied, gives power to the industry and an impetus to the movement in favour of general maintenance.

The particular incidents which led to the adoption of an organized system of maintenance in Greenock need not be related. It is sufficient to say that fully three years ago a careful investigation proved (even to us) that the system in vogue—and it was considered a well-ordered one—did not fit in with modern requirements. Under the old system our public-service relations were fortunately above the average. We did a lot of free maintenance work, and encouraged our customers to think well of us in other ways, but points of public contact were few and far between and limited only to the "perky" counting-house clerk, the hustling, uninterested meter reader, and the soulless, untidy, tobacco-smelling gasfitter and pipe-layer. It was also known that our rivals made a door-to-door canvass of the district; and as they were none too particular as to the accuracy of the facts and figures they supplied to gullible householders, it was incumbent upon us, as business people, to follow them up and tell the people the truth.

Nowadays new customers are difficult to get; and it is easy to lose old ones. If old customers are dissatisfied with the service we give them, it is unlikely they will contemplate an extension of that service. If, therefore, we are to have repeat orders and additional sales of apparatus, it is obviously incumbent upon us to give absolute satisfaction with existing services. Having regard, therefore, to all the circumstances, and realizing that the systematic and regular free overhaul of consumers' appliances is *the* means of retaining custom and goodwill, and also the preparatory step to raising the standard of efficiency in the use of gas and the development of sales, I at once decided in favour of an organized system of maintenance. In a very short time the new system proved to be of inestimable value as a business and goodwill getter. In the free maintenance of consumers' fittings you have an Aladdin's lamp which, if properly used and exploited, will bring you much prosperity.

Hitherto, with no organized system of inspection, and having no regular and sympathetic contact with the public—contact which well-trained, intelligent, smart young inspectors and salesmen now provide—we were losing ground to our "slick" competitors. Now, however, with an organized system, it is the other way round; instead of losing customers we retain them and recover old custom as well.

I have given this subject a good deal of thought; and knowing, I hope, the needs of the industry, and how intense electrical competition has become, the sooner every gas undertaking—large or small—has an organized system of inspection in operation, the better it will be for all concerned.

Might I suggest that, though almost any system of maintenance is better than none, it is a mistake to superimpose a real live modern maintenance system upon an old-fashioned public service edifice. Therefore "plan before you act, and look ahead before you step." Before launching your system set up a real standard specification for services and for the canvassing of houses; see that the existing gasfitting and pipe-laying organization leaves nothing to be desired; be sure that the method of receiving and dealing promptly with complaints and new orders is foolproof; decide to sell at fair working profit only the best appliances, and make a suitable arrangement with plumbers, gasfitters, and ironmongers, so that they also may sell only the best, indeed what you recommend; encourage local traders to work with you, not against you; encourage them to look upon your showroom as their showroom, and try to make their shop windows your district showrooms, even if you give them a cheap supply of gas for window displays. Other points might be mentioned, but they are obvious even to the uninitiated.

With regard to showrooms, it is of the utmost importance that they be kept scrupulously clean, and representative of a real live service. Frequent changes in display are a necessity, otherwise a showroom loses its gripping power, and becomes lifeless. If advertising is indulged in, it should be judicious,

non-controversial, and truthful. Might I here utter a word of warning to the many small and medium-sized gas undertakings who are rapidly coming within the ambit of the linked-up electricity undertakings? Most of them are doing nothing to ward-off the advance upon their territory; and I am afraid that, unless managers are encouraged to proceed with works improvements and to engage in district propaganda, directors of companies and local authorities will have themselves to blame if business losses lessen profits. Incidentally, disgruntled gas consumers in badly-served districts do a tremendous amount of harm to the gas industry generally, and retard real co-operative advancement. Remember, "He profits most who serves best."

Particulars of our simple free maintenance scheme were recently given in a paper to the Scottsh Salesmen's Circle by my Chief Assistant, and fully published in the "Gas Salesman" for Jan. 28.

All our public service employees, including maintenance men, meter readers, inspectors, gasfitters, foremen, showroom attendants, and the staff generally, work shoulder to shoulder. All our men are naturally enthusiastic, and I personally try to share the burdens of the men on the firing line: "It's dogged as does it; and nothing succeeds like success."

Our industry is of great national importance, despite the forgetfulness of the politician. Its manufactures are unexampled. Gas is an indispensable article of commerce. It is the cheapest form in which light, heat, and power are obtainable. Coal conservation, the achievement of a smokeless atmosphere, and better health for all are the aims of the gas industry, and all its actions from the scientific carbonization of coal to the promotion of gas sales and the teaching of the public in the efficient use of the gas consumed are actuated by these aims. This is surely something to boast about in these highly scientific, highly competitive times; and if we are to be true to our heritage and retain our place in the sun, surely something more is required of us to-day than a continuance of the talk which has been going on for thirty or forty years. Now we have all got to act; and I sincerely hope that this meeting will resolve unanimously in favour of the immediate adoption of free maintenance.

A contribution by Mr. J. W. M'Lusky, of Glasgow, together with the general discussion, will be published next week.

INSTITUTION OF ENGINEERS-IN-CHARGE.

Twenty-Fifth Annual Dinner.

That the Institution of Engineers-in-Charge, who were incorporated in 1923, are in an exceedingly flourishing condition was manifested by the crowded attendance at the twenty-fifth annual dinner—which took place last Saturday evening, in the Venetian Chamber of the Holborn Restaurant. Members are, of course, not everything in an organization of this character; but no one who was privileged to attend the function could doubt that the enthusiasm which is also necessary is present among the members in abundance.

The chair was occupied by Mr. T. Cooper, M.A.(Cantab.), M.Inst.C.E., M.Inst.Mech.E., M.Inst.E.E. (Engineer-in-Chief to the Metropolitan Asylums Board), the President of the Institution; the Vice-Chairman being Mr. C. A. Pickles, who is Chairman of the Institution. There were a large number of guests, the acceptances including Col. Sir Arthur Holbrook, K.B.E., M.P.; Mr. W. H. Patchell, M.Inst.C.E., M.Inst.Mech.E., M.Inst.E.E., Past-President of the Institution of Mechanical Engineers; Captain H. Riall Sankey, C.B., C.B.E., M.Inst.C.E., R.E. (Ret.), Past-President of the Institution of Mechanical Engineers; Mr. E. A. Sandford Fawcett, C.B., M.Inst.C.E., Chief Engineering Inspector to the Ministry of Health; Dr. Alex. Russell, M.A., LL.D., F.R.S., M.Inst.E.E., President of the Institution of Junior Engineers; Dr. W. R. Ormandy, F.I.C., F.C.S., President of the Institution of Automobile Engineers; Brigadier-General Magnus Mowat, C.B.E., M.Inst.Mech.E., Secretary to the Institution of Mechanical Engineers; Mr. Alcwyn A. Jones, President of the Institution of Heating and Ventilating Engineers; Mr. Leon Gaster, M.Inst.E.E., Secretary to the Illuminating Engineering Society; Mr. G. Stevenson Taylor, O.B.E., H.M. Senior Engineering Inspector of Factories.

Science and Industry.

Following upon the Loyal Toasts, Mr. W. H. Patchell submitted "Science and Industry." Science and industry were, he said, very close together, and he thought it was impossible for them to be too close together. Could one, indeed, tell where the one ended and the other began? It would be very difficult. Personally he would have worded the toast "Industry and Peace." Peace was the more urgent thing for them at this time, because without peace among themselves they could not use their industry, and they could not use their science. So industry and peace were now what they were all striving for, and both were absolutely essential to them.

Dr. W. R. Ormandy, in reply, remarked that there was no doubt that this country, since the war, had not maintained that regard for science which made itself so evident when the Government discovered that they could not do without the scientist and the engineer. During his own visits to the Continent he had seen some most astonishing things, one or two of which he would like to mention. It was really remarkable to see what was going on around them. The members might have heard that methyl-alcohol was used very largely in the manufacture of dyes and disinfectants. Well, this country was dependent upon the wood distillers of America for its supplies. But the Germans had discovered, after ten or twelve years' work, that, by passing water gas over a catalyst at a high temperature and high pressure, they could make methyl-alcohol, and of this they were at the present time producing some 6000 tons a year. This country was buying from America at £50 or more per ton what Germany was thus turning-out at a cost of about £12 a ton. But in this country did one think it was possible to get manufacturers to spend tens of thousands of pounds a year merely because their technical advisers had told them there were difficulties which could be overcome? In Germany, they had realized that science paid, and was an asset to a country.

Converting Coal into Oil.

They had also succeeded in Germany in converting coal into oil—not distilling the coal, but charging it into a retort under pressure and heating in the presence of hydrogen, so converting a large proportion of the coal into oil. This did not yet appear to be a commercial proposition; but they were dealing with half-a-ton an hour, and in his opinion the technical difficulties which still remained would be solved. When this happened, it would alter the whole economic position of the world. By means of coal, countries would come into their own again; and the British Empire, possessing coal deposits in practically every Colony, would be in a position which to-day it unfortunately did not occupy. There was no doubt about it that petrol and heavy oils were the fuels of the future. More than one European Government were taking a practical interest in the question; and the Fuel Research Board of this country were by no means behind their Continental neighbours in the attention they had given to this important development. In connection with various matters, marvellous progress was being made every day. "We in this country," concluded Dr. Ormandy, "have no reason to hide our heads. Where we have failed is that we have left it to Germany to develop our discoveries into commercial propositions. Science pays, and science is industry; they are one and indissoluble."

Col. Sir Arthur Holbrook, proposing "The Institution," recalled the fact that on a similar occasion a year ago the principal speaker had urged upon them all the great importance of research. The truth of what was then said had been amply borne out by Dr. Ormandy. There was no doubt in his own mind that, if the English people made up their minds to it, they could lead the whole world. They must wake up to the fact that engineering in this country had reached a position which called for very serious thought. Workmen must give a full output for the wages they received, and this could only be achieved by the establishment of peace in industry. Surely the time had arrived when they should all be settling-down to see what could be done to restore this country's position as a great commercial power. He agreed that those who were leaders had given insufficient attention to scientific research; and this must be changed. But the great aim of all of them for the time being should be to try to get a better understanding between masters and men—to endeavour to restore confidence. The growing class feeling must be broken-down. The Institution could do a great deal to bring about that good feeling which was so greatly to be desired.

Responding, the President pointed out how greatly the status of the engineer-in-charge had improved during the last quarter-of-a-century. At the present day greater economy and increased efficiency were absolutely essential; and the best results could only be obtained by the exercise of the skill of the engineer-in-charge.

"Our Guests and Friends" was submitted by Mr. W. R. Welton (the Chairman of the Technics Committee), and responded to by Mr. H. G. Burford, who urged the need for closer co-operation between the Institution and the senior organizations of the country. "The President" was toasted, and in reply Mr. Cooper acknowledged the zealous service rendered to the Institution by Captain Alfred E. Penn, the indefatigable Hon. Secretary.

Smoke Abatement.

At a sessional meeting of the Royal Sanitary Institute recently held at Leicester, Mr. F. G. M'Hugh, Chief Sanitary Inspector at Leicester, read a paper on "Smoke Abatement." In this he emphasizes that domestic smoke presents the greatest problem; and he goes on to say that there are three remedies—gas, electricity, and smokeless solid fuel. Electricity for heating can be dismissed, on account of expense. Gas also is expensive for the poorer classes. He mentions the interesting decision of the Hull Corporation to instal central heating in 600 concrete houses about to be built. In the Austin Motor Company's village at Northfield, near Birmingham, each house has its central heating system, which is coke fired. These dwellings are smokeless, popular with the tenants, economical in fuel, and well ventilated. Cooking is done by gas. It is the opinion of Mr. M'Hugh that the solution of the domestic smoke problem lies in low-temperature carbonization. In this connection he refers to the Nottingham scheme: "The manufacturers of Coalite have entered into a contract with the Nottingham Corporation, who have undertaken to purchase a minimum of 2 million c.ft. of gas per day for a long period. A further contract has been entered into with a colliery company for coal for 25 years. The plant, it is stated, will be capable of dealing with 1000 tons of coal per day. I am given to understand that this scheme is receiving Government support."

NEW GAS-WORKS AT PITWINES, POOLE.

[Extracts from a Supplement to the Presidential Address of Mr. P. G. G. Moon, F.C.S., to the Southern Association of Gas Engineers and Managers.]

The gas requirements of the Bournemouth Gas and Water Company's district have, in the past twenty years, practically doubled in each decade. The popularity of the 25 miles of coast land administered by the Company, and the continuous estate development that is taking place throughout its length, suggest that this tendency will persist for a considerable time to come. It became obvious a few years ago that, having regard to the congested state of the existing works of the Company at Poole, it would be necessary in the very near future to construct new works to meet the continually growing demand.

Two courses were open to the Company. One was to acquire land adjoining the existing works on Poole Quay; but as this would have involved the compulsory acquisition and demolition of some seventy cottages and a large pottery works, as well as leaving the extended works closely surrounded by houses, it was turned-down. The second was to obtain full parliamentary powers over the Pitwines site, situated some 500 yards inland from the Poole Quay Works, and on which the Company already had purifiers and a 2¾ million c.ft. gasholder. The chief disadvantages of the site were: First, that it was reclaimed harbour mudlands, with very poor subsoil for foundations; and, secondly, that there was no direct access to a deep-water berth on the harbour. After careful consideration, it was decided to extend on this site, and to overcome the lack of deep-water accommodation by connecting-up the existing coal unloading transporters at Poole to the new site by means of an overhead cable conveyor. The necessary powers were obtained in 1919, and designs for the new works were started in 1923.

GENERAL VIEW OF WORKS FROM THE AIR—OCTOBER, 1924.

Note the special reclamation for the Coal Store.

General Scope of the Works.

After a careful study of the whole position, it was decided to lay out the works to have an ultimate capacity of three sections of 4½ million c.ft. per day each, or 13½ million c.ft. per day in all. Having regard to the difficulty and risk of putting in foundations at a later date in such difficult ground alongside existing buildings, and having in mind the normal rate of increase at Bournemouth, it was decided to put in such buildings as the main block (housing the water gas plant, boilers, producers, exhausters, and electric generators), the coal store, and sulphate house of sufficient size to deal with the whole of the three sections.

It was estimated that the first section would provide adequate capacity for four to five years from 1925 onwards.

Foundations.

A large number of borings were made and carefully plotted. Below the reclaiming material, which consists of some 3 ft. 6 in. to 10 ft. of clinker, lies a layer of harbour mud of thickness varying from 1 ft. 6 in. to 8 ft. Under this there is a bed of clay of circumscribed area and varying thickness, all of it well below tide level. Beyond the confines of the clay there is nothing but a great depth of fine waterlogged sand. The whole area is full of tidal water; and the sand is at such a depth, and so fine, that the extensive pumping which would be necessary would be both costly and full of difficulty and danger. Altogether some 74 borings were made.

It was found that there was room on the thicker portion of the clay bed for the retort house and the relief holder, but that all the rest of the plant would have to depend either on reinforced rafts below the mud level or upon reinforced concrete piles. Careful estimates were made of the comparative costs of these two methods, with the result that it was found that, although expensive, the piling method was cheaper than the raft method, largely because of the considerable excavations that would be necessary in the latter case to get below the mud level, and the large amount of timbering and pumping that would be required.

Experiments were made with 14 in. square reinforced piles, and it was found that a good "set" could be obtained at an average depth of from 25 to 30 ft. The piling method was finally adopted, and the variations in the ground resistance as the work proceeded fully confirmed the wisdom of this decision. In many cases the piles would penetrate fully 8 ft. practically by their own weight. Some piles would reach their "final set" with the head of the pile 1 ft. below ground level, while piles of the same length (30 ft.) right alongside would finish 8 ft. out of the ground. The set specified was "that when using a 30 cwt. ram with a fall of 4 ft. 6 in., the piles should not have a set of more than half-an-inch after ten blows." The piles, after driving, were cut-off to the various required levels, capped, and braced or covered with reinforced concrete rafts, as circumstances required.

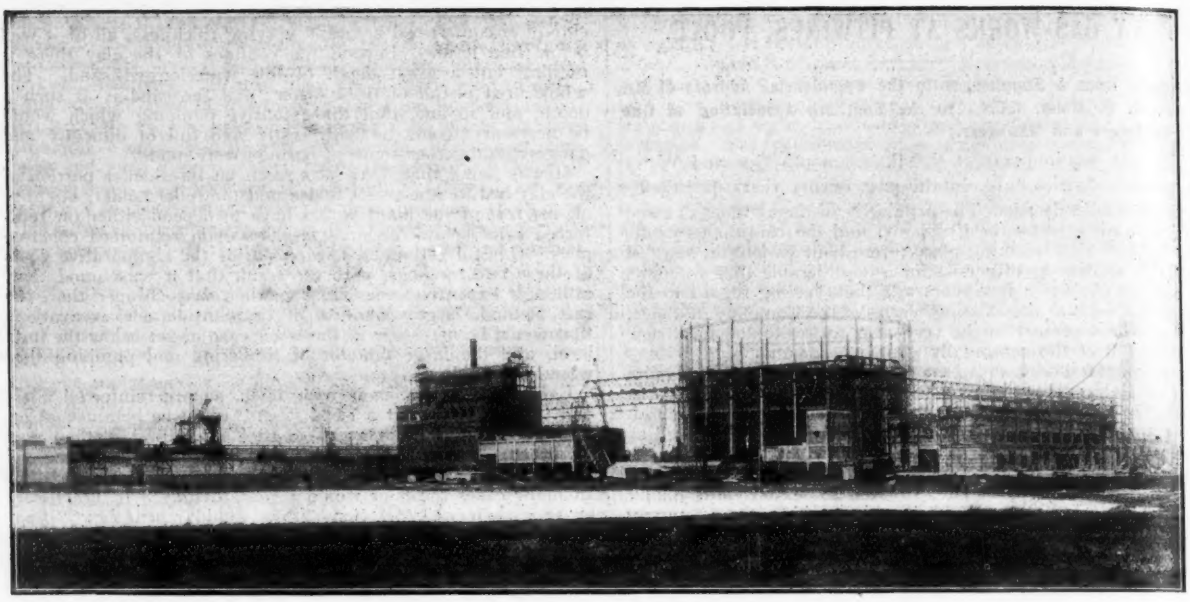
The carrying capacity of the 14 in. square piles has been taken throughout the job at 50 tons per pile, with a factor of safety of six. After some preliminary experiments, the Birmingham Concrete Steel Company, who were responsible for the reinforced concrete design throughout the works, submitted data which justified the adoption of 50 tons per pile as the safe carrying-load for the conditions obtaining at Pitwines.

Some interesting facts were noted during the pile driving:

(*a*) Owing to the mud layer and the superincumbent reclaiming material, considerable vibration was set-up during driving in a large area of the surrounding land. The vibration was so considerable that it was obvious there would be considerable risk if driving were done alongside existing buildings.

(*b*) The piles passed through the tough clay bed, where it was encountered, with comparatively small resistance, and only on reaching the fine sand below was real resistance found.

(*c*) Two piles driven alongside the retort house foundations, which were in the form of reinforced concrete slabs carried on the clay, and not on piles, lifted the nearest loaded retort house foundation 2 in., and cracked the re-



GENERAL VIEW OF WORKS — MARCH, 1925.

inforced beam of which the foundation was formed. The displacement effect of the piles must have acted on the clay as on a fluid, and pushed up a wave of clay, which gave an upward thrust of sufficient intensity to lift and crack the loaded foundation slab.

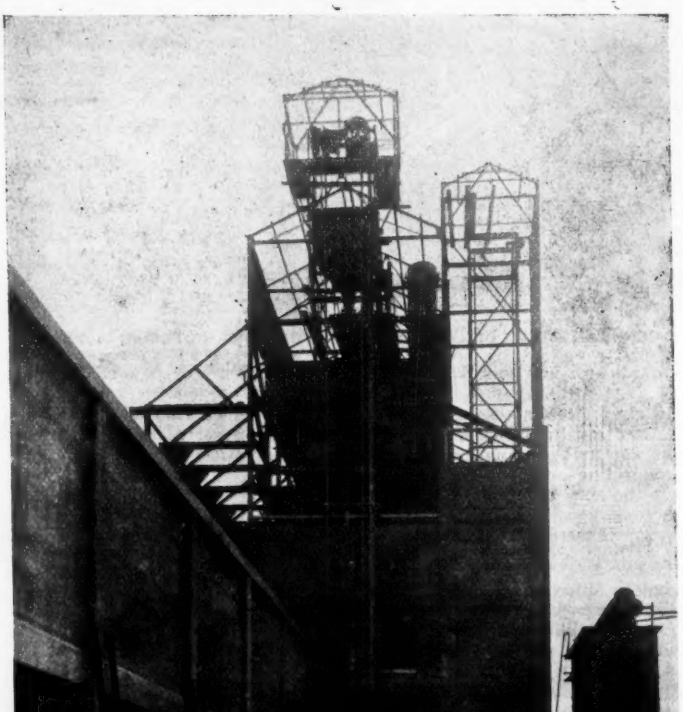
General Arrangement.

Broadly the works are set-out in relation to two base lines—one through the main block of buildings parallel to the railway, and the other at right angles thereto for the retort houses.

Cableway Conveyor.

The cableway conveyor is the connecting-link between the existing Poole Works at the quayside and the new works at Pitwines. It is designed for an ultimate capacity of 100 tons of coal per hour, although it will at first function at 50 tons per hour. It is of the double cable type—one cable being fixed and supporting the loaded buckets which run on it, and the other moving and acting as the hauling cable. The total power required when the cableway is called upon to take 100 tons per hour will be 15 H.P. One man only is required to operate it. He works at the loading end; the tipping being done automatically. The automatic self-tipping buckets take 12½ cwt. of coal each, and "shot-pouch" filling arrangements prevent over-filling, and so reduce the risk of dust.

The cableway takes coal, coke, and ashes from Poole to Pitwines, and can, if necessary, take coal from Pitwines and feed it into the retort house conveyors at Poole. Coal can be fed from the steamer, *via* the transporters and the cableway, direct



RETORT HOUSE, SHOWING SKIP HOIST GUIDES.

to the retort house or coal store at Pitwines. The cableway will pass over two public roads, which are protected by reinforced concrete bridges; and here the carrying cables are arranged one above the other.

The cableway conveyor, protection bridges, and loading stations were all constructed by the Mitchell Conveyor and Transporter Company.

Coal Store and Coal Handling Machinery.

The terminal station of the cableway is at one corner of the Pitwines coal store. Here automatic tripping devices are arranged to trip the cable buckets into any one of the three hoppers provided for coal, coke, or ashes respectively. The coke and ashes are picked-up from their hoppers as required by the telpher, which is designed to serve the terminal station at this point. The coal is fed from its hopper on to a reversible rubber belt conveyor 24 in. wide, which runs the whole length of the coal store. From the reversible belt, the coal is taken either direct to the retort house through an automatic Avery weighing machine or on to a travelling belt conveyor 18 in. wide, which can be traversed to any position in the coal store with its throw-off carriage set at any required spot. The throw-off carriage is 26 ft. above ground-level, and the coal store can be filled throughout, without man-handling, to an even height of 20 ft. The travelling conveyor is carried on a steel-framed traversing bridge supported by the two longitudinal walls of the coal store and by a central reinforced concrete gantry down the middle of the store.

The coal is reclaimed when necessary by a travelling level luffing electric crane with a grab of 30 cwt. capacity. The crane is carried on a girder bridge spanning from one wall to the central gantry. The crane jib is long enough to reach from its central position to either side of the coal store, and to deposit the coal either into a feed hopper for the reversible belt conveyor or, when it is desired to send coal from Pitwines to the Poole Works, into a reinforced concrete feed hopper for the cableway conveyor.

The coal store itself is constructed of reinforced concrete, 315 ft. long by 100 ft. wide, with the rail level for the crane and conveyor 20 ft. above ground. A dust and wind screen is carried to 7 ft. above the rails around three sides of the store in thin reinforced concrete. The total capacity of the store is 15,000 tons.

An attempt has been made by a very broad but comparatively inexpensive treatment, to relieve what must otherwise have been, having regard to the over-all dimensions, an unsightly box-like construction, and give it a more pleasing elevation. The effect has been obtained by oversailing 18 in. with the wind and dust screen walls, which are carried on precast corbel blocks, at the same time setting-out the walls at each corner and carrying the apparently massive buttresses so formed above the general level.

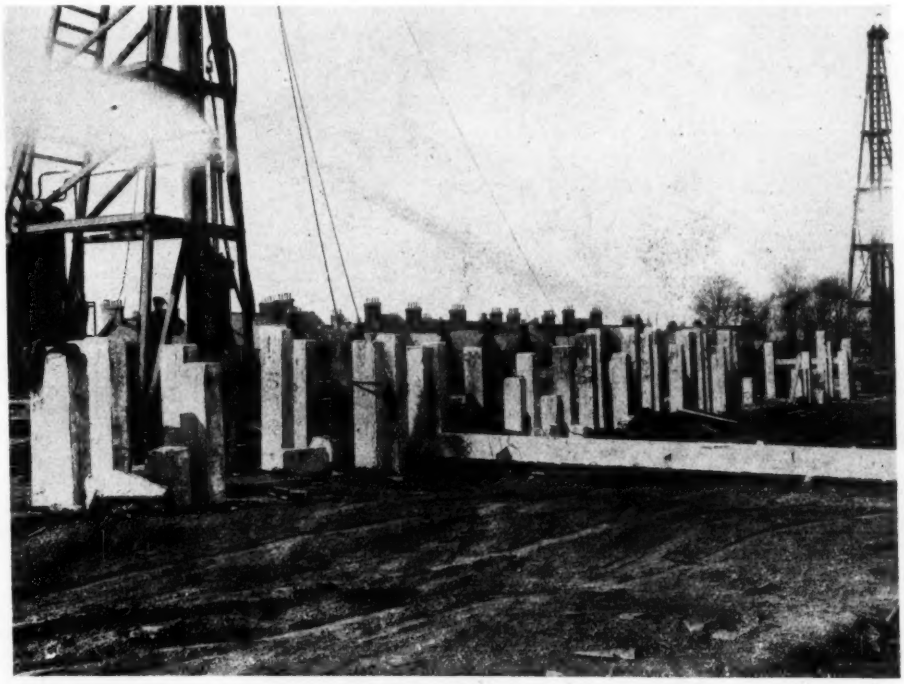
Retort House.

The retort house is planned with its main axis at right-angles to the coal store, and in such a position that it can receive coal from the reversible belt conveyor running parallel to the coal store through the Avery automatic weighing machine into an automatic electric skip hoist which will be described later. The retort house is of the Woodall-Duckham vertical type, and has six beds of four 7-ton retorts arranged in two benches. The retorts themselves, with their heating flues, are built-up of silica blocks so designed that the "breathing" due to expansion and contraction can be accommodated without distortion of the retorts or flues.

Two producers are arranged at the end of each bench; and the carbon monoxide flues, secondary air flues, and regenerators are disposed along the longitudinal walls of the retort bench so that they are available for inspection or repair with a minimum of inconvenience. The producers are of the hanging-bar grate type, and special attention is given to the distribution of cooling water for the bars and the sealing of the water plate against short circuiting. The ashes are continuously extracted into a cast-iron hopper of the same type as that used for the coke extraction on the retorts.

The waste gases are passed through a waste-heat boiler having a capacity of 4750 lbs. of water per hour from feed at 60° Fahr. to steam at 120 lbs. per sq. in.

The coke is received into telpher skips of the balanced-wheel type, of sufficient size to take the coke from four dischargers. The skips are then pushed out and lifted by a telpher, which takes them to the coke hoppers or any desired part of the works. The plant for filling the top coal and coke hoppers consists of automatic electric skip hoists and belt conveyors. With the skip in the bottom position, coal is allowed to run from the Avery automatic weigher; and as soon as the weight exceeds an arranged figure, the hoist starts upwards, and the supply of coal is automatically cut off. When it reaches the top, the skip automatically tips and descends. On reaching the bottom position, it opens the coal feed again, and the cycle of operations is repeated.



PILING FOR MAIN BLOCK BUILDING.

Note the difference in the final levels of the various piles.

The coal at the top, when discharged, is fed on to a fixed rubber belt which runs over the hoppers nearly to the middle of the house. From this belt, it falls on to a short reversible rubber belt, which is mounted on an independent framework carried on wheels, which can be traversed so that one or other of its ends is over any hopper (either coal or coke) in the house. It will be seen that by this arrangement coal or coke can be automatically put into any hopper from either the coal hoist at one end of the house or the coke hoist at the other.

The screened coke is fed from the outside concrete coke hoppers into the coke-hoisting skip by a reversible rubber belt conveyor operated electrically from the top of the retort house. The coke skip discharges at the top of the retort house on to a fixed belt conveyor similar to the one at the coal hoist end, and this in turn discharges on to the shuttle belt conveyor.

The skip hoist and belt conveyors were supplied by the Mitchell Conveyor Company, who have many similar installations working in large electricity generating stations.

The retort house is of steel framework, filled with Bridgwater brick panels; and the roof is covered with corrugated iron sheeting, protected by bitumastic covering, and coloured a dark

maroon. The house and bench are built on reinforced concrete rafts carried on a clay bed 13 ft. below ground-level; and, as the latter is 7 ft. O.D., it will be seen that the rafts are well below tide level. The full guaranteed capacity of the house is 2,730,000 c.ft. of gas per day of 480 B.Th.U. The pressure regulation is effected by means of "Arca" regulators.

The present retort house is built at one end of the coal store; and the lay-out of the coal store and works generally is designed to accommodate two or three more retort houses of either vertical or horizontal type, parallel to the first, all capable of being served by the existing coaling plant.

Coke Hoppers and Screening Plant.

The telpher serving the retort house is arranged to pass along the centre line of a set of reinforced concrete coke hoppers. The same telpher and an extension of the coke hoppers on the present line will serve the second retort house when it is erected. An attempt has been made in the design of the hoppers and screening plant to overcome some of the disadvantages of our present methods. The average rotary coke screen is normally fairly long, and has to serve the purpose not only of a screen, but also of a very inefficient conveyor, thus tending to increase the amount of breeze made. In the present design the coke hoppers have been divided into three carefully-proportioned longitudinal partitions; and on the two middle walls a very short rotary screen has been mounted, which can be traversed from end to end of the hoppers. The line of travel is coincident with the telpher centre line; and the hopper on the screen can take a full telpher skip. The screen is of 4 ft. 6 in. in diameter and 11 ft. long, of which only 8 ft. is perforated. It separates the breeze in the first portion and the broken coke in the remaining portion; and the large coke falls out at the end. The whole of the sections are enclosed to reduce dust, and shoots lead the screened products to their appropriate longitudinal hoppers. The breeze, having the steepest angle of repose, falls into the central narrow hopper. With this arrangement not only is the travel in the screen reduced to a minimum, but the falling coke can be largely arranged to fall upon existing coke slopes, and further breakage due to long drops can be avoided.

Condensers.

The condensers are of the Holmes type with horizontal cast-iron tubes arranged with water headers so that the water circulation follows a definite path throughout. They are of 3 million c.ft. capacity, and according to tests made with similar condensers at Poole are more efficient and reliable than any other type. The following figures give some idea of the performance of this type of condenser when dealing with 2½ million c.ft. of gas per day:

Water inlet	58° Fahr.
Gas outlet	60° ,,
Water outlet	121° ,,
Gas inlet	140° ,,

They have the added advantage that the water tubes are accessible for cleaning purposes without shutting-off the gas stream.

Owing to the peculiar difficulties of the site, the foundations for the condensers for the future No. 2 retort house were put in at the same time as the general foundations for the first section.

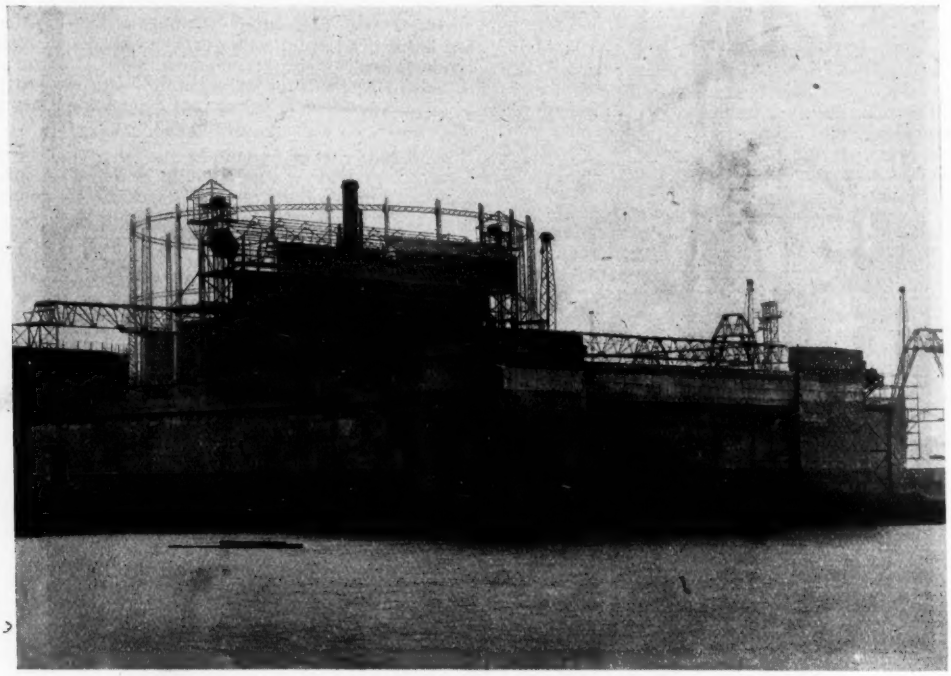
Main Block Buildings.

The main block buildings are designed to house ultimately all the water gas plant, boilers, exhausters, and generating plant required for the completed works, as well as the fitting shops and messrooms. They are designed in reinforced concrete carried on reinforced concrete piles; and, as with the coal store, an attempt has been made, by a simple treatment, to give them a reasonably pleasing appearance. The three fuel-using plants—water gas, boilers, and producers—have been arranged adjacent to each other, and the hoppers serving them are on the line of the telpher.

The hoppers are of sufficient capacity to hold three days' fuel, so that no night or week-end work on the telpher is necessary in filling them. Instead of designing these hoppers as a separate structure supported on the roof of the building, they have been incorporated with the whole design, and have thus given a better opportunity for developing the general elevation.

Between the hoppers for the water gas and those for the boilers an ash shaft has been left, with a sunk well, so that a skip just below ground-level is always available to receive ashes from boilers, water gas plant, or producers. These are dealt with by the telpher, which also runs over the ash washing plant.

A deep parapet around the power house roof masks the four cast-iron tanks supplied by Messrs. Mather and Platt: Hard water, 47,000 gallons; soft water, 47,000 gallons; salt water, 27,000 gallons; and weak liquor (covered), 27,000 gallons. When full these tanks represent a load of 800 tons on the roof.



COAL STORE, WITH RETORT HOUSE AND TELPHER IN BACKGROUND.

In the top of the two towers flanking the telpher section are placed two cast-iron tanks of 17,500 gallons capacity each, also by Messrs. Mather and Platt, for high-level water and strong liquor respectively.

Carburetted Water Gas Plant.

The carburetted water gas plant consists of one set of 2 million c.ft. per day capacity by Messrs. Humphreys and Glasgow. The generator is of the self-clinkering type. It is unlined, and jacketted with a water boiler. The bottom of the generator shell ends in a water seal carried in a revolving cast-iron ash pan. The latter carries a conical grate which projects above the water seal and supports the fuel bed. This conical grate is set slightly eccentrically to the generator shell, so that any large clinkers which drop into the annular space between the grate and the shell are crushed as the ash pan revolves. A charger, hydraulically operated, feeds the coke from the hoppers overhead into the generator while the latter is at work. With the self-clinkering grate and the hydraulic charger 24 hours full operating per day is possible. That is to say, with a six-minute cycle, 240 runs in the 24 hours are possible. Automatic chargers are fitted to the four water gas sets in use at the Poole Works. They have been very successful, and have increased the output of the plant by 7 to 10 p.ct. The plant is fitted with a waste-heat boiler of the usual type and the latest design of dust extractor.

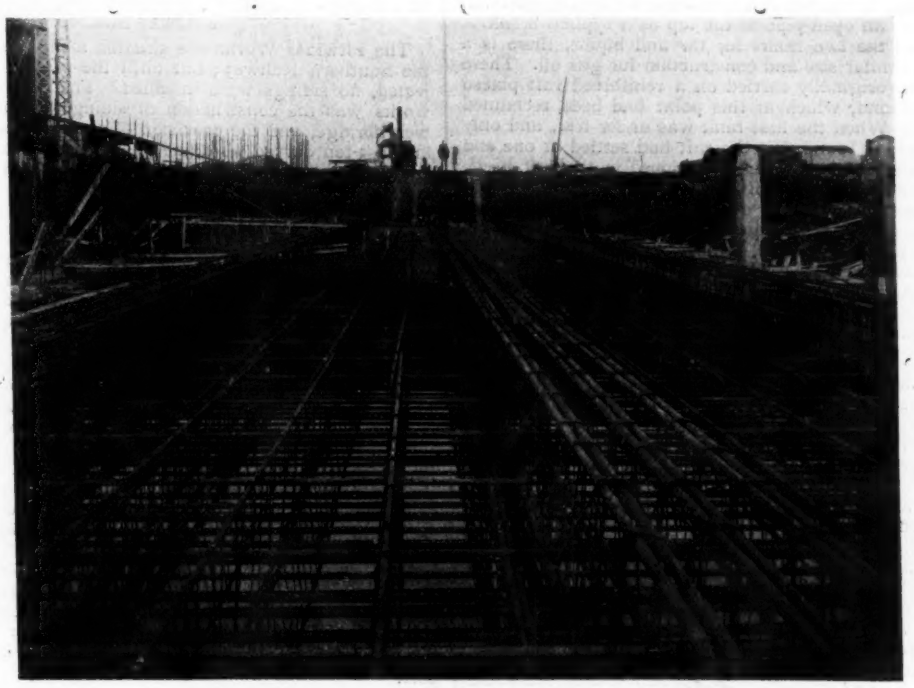
Boilers.

Two Stirling water-tube boilers of 10,000 lbs. per hour capacity each are installed, fitted with Babcock and Wilcox chain grate stokers mounted independently on rails, so that they can easily be withdrawn bodily for repairs. These stokers are interchangeable. Continuous carbon-dioxide recorders are connected to each boiler. It has been found that with similar boilers at Poole, also controlled by carbon-dioxide recorders, an evaporation is obtained of 6·8 lbs. of water from and at 212° Fahr. per lb. of coke breeze. The whole of the steam-using apparatus on the works is arranged to exhaust to vacuum, using two 1000 H.P. tubular condensers originally fitted in torpedo-destroyers and bought from a local ship-breaking yard for £250 each, complete with air pumps.

Producer Plant.

Alongside the boiler house are situated the 350 H.P. Dowson suction producers which supply the gas for the gas-engine dynamo plant in the adjoining power house. These are placed in this position not only so that they shall be near the engines and under the hoppers, but also that they may be served by the one stoker, who will be in charge of the boilers, water softening plant, feed pumps, condenser plant, and hopper storage.

Some criticism has been passed on the use of producer gas for power production on a gas-works. In reply to this, it may be pointed out that a "load" of the type found in a gas-works power house, persisting as it does throughout the whole 24 hours, eliminates most of the disadvantages usually, and rightly, associated with such plants working intermittently.



REINFORCEMENT FOR RETORT HOUSE FOUNDATIONS.

Water Softening Plant.

The water softening plant of the "Permutit" type, installed by United Water Softeners, Ltd., is situated in the producer house. It has a capacity of 48,000 gallons per 24 hours. A similar plant, but of larger capacity, has been in use at the Poole Works for some time past, and has proved itself to be very reliable. Some such plant is particularly desirable for waste-heat and water-tube boilers. Two precautions are necessary, however. One is to "blow down" the boiler at sufficiently frequent intervals; the other is to use Monel metal for the valve seatings and gauge fittings, as brass and gun-metal are attacked by the alkali in solution.

Power and Exhauster House.

The whole of the coal gas and water gas exhausters, electric generating plant, water gas fans, and compressors for the completed works will be housed eventually in the one building. The plant, when finally installed, will be looked after by one charge hand and one assistant per shift.

The exhausters will be of uniform size throughout—viz., 125,000 c.ft. per hour. Three, made by Messrs. G. Waller & Sons, are installed at present. They are situated on an elevated platform, with three lines of easily accessible mains on the inlet and outlet sides respectively. These are so arranged that the gas from any inlet main can be put through any exhauster and into any outlet main. This uniformity of arrangement and interchangeability of exhausters simplifies the problem of stand-by plant, and also reduces the number necessary.

The first two electric generating sets consist of two 150 KW. 230 volts D.C. British Thomson-Houston generators, direct coupled to two 250 H.P. twin cylinder horizontal gas engines. The whole installation of producers, gas engines, dynamo, compressors, and auxiliaries was supplied by the Keighley Gas Engine Company.

In the power house are also situated the two 75 H.P. steam turbine blast fans for the water gas plant. These also run to vacuum, and are connected to the water gas plant by a rectangular reinforced concrete duct of 3 ft. 6 in. by 2 ft. section, instead of the usual sheet-iron circular tubing.

Electricity Distribution.

The main switchboard is situated in the power house, and is fully equipped for the first installation, with provision, in the shape of spare panels, for the succeeding installations. The panels are of white marble, and are fitted with the necessary switchgear, meters, circuit breakers, &c. From experience at Poole with switchgear operating in gas-works atmosphere, it was decided to increase the size of the frictional copper segments to obtain increased life; the knife switches being made 100 p.ct., and the circuit breakers 200 p.ct., larger than normal practice.

In order to reduce the number of long cables to a minimum, the whole of the power for the retort house and coal and coke-handling plant is dealt with by a separate cable carried to an auxiliary switchboard, situated in the retort house. This board is of black slate and is totally enclosed in a dust-proof glass panelled housing.

Compressed Air Plant.

The air compressors are both of the Reavell rotary type, one steam and the other electrically driven. They are of 153 c.ft. of free air per minute capacity, and compress to 100 lbs. per sq. in.

Gantry Cranes.

Travelling gantry cranes span both the exhauster bay and the main bay, and a horizontal gap of adequate size has been left in the wall dividing the power house from the fitting shop, so that the crane can pass right through into the fitting shop, taking with it any machinery requiring attention—which can in this way be taken direct to the appropriate lathe or machine which is to deal with it.

At the end of the main block, adjoining the power house, are situated the workshops, and above them the messrooms, bathrooms, lavatories, and cloakroom.

Telpher.

The telpher is designed to connect the retort house, coke hoppers, main block buildings, ash washing plant, and cableway terminal hoppers. It makes a complete circuit in passing these various points, and for the first and second sections of the works will operate without a rail switch of any kind—a decided advantage in a telpher.

Relief Holder.

The relief holder, constructed by Messrs. Clayton, Son, & Co., is of 400,000 c.ft. capacity. The steel tank is carried

on a concrete raft on the clay 13 ft. below ground-level. It is placed where it can be readily seen from the water gas house, and is designed with two lifts, spirally guided, and with a special guard plate running round the curb of the outer lift to prevent oil tar picked-up by the inner lift from overflowing and running down the outside of the outer lift.

Ammonia Extraction Plant.

The ammonia extraction plant consists of a Livesey washer, rotary ammonia washer, and a special lead-lined acid washer. No water is used on this plant. The weak liquor from the retort house is used in the rotary washer, and the ammonia left in the gas is absorbed in the acid washer, the contents of which are kept at about 4 p.ct. acidity. This system has been in use at Poole for many years, and considerably reduces the volume of liquor made. The concentrated acid solution of sulphate of ammonia is used up in the saturator. The whole of this plant was supplied and erected by Messrs. W. C. Holmes & Co.

Tar and Liquor Storage.

The tar and liquor from the retort house are received in two small boiler tanks of about 2000 gallons capacity each, placed below ground-level. These tanks are arranged so as to promote the separation of tar and liquor; these latter being pumped separately to overhead storage tanks. These main storage tanks are of mild steel, covered, and of 200,000 gallons capacity each, standing on a reinforced concrete raft carried on piles. The evaporation of ammonia from the liquor storage is prevented by a 3-in. layer of gas oil. The liquor inlet, which enters at the top, is carried to the bottom under the oil level, and is fitted with an open pipe at the top as a syphon break.

In addition to the two tanks for tar and liquor, there is a third tank of a similar size and construction for gas oil. These three tanks were originally carried on a reinforced raft placed direct on the ground, which at this point had been reclaimed for many years. When the first tank was under test, and only one-third full, it was found that the raft had settled at one end some 4 in., and serious cracks had developed in the raft itself. As this represented the effect of some 600 tons only out of a full load for the three tanks of over 3000 tons, it was obvious that it would be necessary to transfer the tanks to new foundations supported on the requisite number of reinforced concrete piles, and this was eventually done. This experiment was unfortunate in some respects; but it at least served to justify the policy which had been generally adopted with regard to the foundations of the rest of the works.

Tar Treatment Plant.

Near the tar and liquor storage tanks is placed the plant for dealing with the tar required for road tarring, &c. A 3000 gallons per day Wilton dehydrating plant has been removed from the Poole Works and re-erected on the new site. Alongside has been erected a new cascade type of plant of 10,000 gallons per day capacity, supplied by Messrs. Clayton & Co. Mixing tanks for preparing a special mixture of tar and bitumen for road surfacing have also been provided; and the storage and delivery tanks for the prepared tar and the tar and bitumen mixture are arranged in line with the general tar plant. These delivery tanks are erected sufficiently high above ground-level to allow of the barrels being filled on a loading platform at the level of the motor lorries which transport the tar. In close proximity to these plants a small tar macadam plant has been erected. This has made the tar macadam used in the works paths and secondary roads, and is now available for making macadam for footpaths for the various local authorities.

Ash Washing Plant.

The ash washing plant, which is constructed in duplicate, is situated on the line of the telpher, and deals with the ashes from both the Poole Works and the Pitwines Works. An inclined rotary cylinder separates the clinker from the coke by means of an internal angle-iron spiral and a descending stream of water. The coke is, by reason of its lower specific gravity, washed to the bottom end of the cylinder, and the clinker is carried to the top of the spiral angle-iron. The water used is circulated continuously by a centrifugal pump, and the fine dust is collected as sludge by sedimentation in settling tanks. This system has proved very effective for many years past in the Poole Works in a plant costing approximately £750. The cost of coke recovery over 22 months (excluding interest on capital) was 3s. 9d. per ton of recovered coke.

Purifiers.

No provision has been made for the construction of additional purifiers for the first section. This is due to the fact that the existing purifiers have a reserve capacity which will serve adequately for the requirements of the Company for the next two years.

Sulphate of Ammonia Plant.

The designs for the sulphate plant and house have been completed, and the contract placed, but no work upon them has been commenced at the time of writing. The whole of the liquor from both works will be treated by this installation, and provision has been made in the general lay-out for three sections, one only of which will be put in at first. The output of this section will be 6 tons of dry neutral salt per day, when working with 8-oz. liquor. Except for two special features the plant, which will be erected by the Chemical Engineering Company, substantially follows present-day standard practice. One of the special features is the placing of the liming or soda ash plant (whichever is in use) at the top of the building, so that the alkali enters the lime still by gravity, thus doing away with the lime pump. The second novel feature is the arrangement for collecting the hot sulphate from the saturator and storing it in a steam-jacketted vessel in readiness for the centrifugal—an arrangement based largely on patents taken out by Dr. Lessing. A microscopical examination of the salt as it came from the saturator and as it left the centrifugal in ordinary practice showed a large increase in the number of very fine crystals, due undoubtedly to the lowering of the temperature of the magma on the draining board. This not only promoted the deposition of fine crystals in the super-saturated solution, but also retarded the subsequent drying operations. To overcome these objections, a steam-jacketted Monel-metal vessel has been designed to hold enough sulphate for one centrifugal charge; and the magma from the saturator is discharged into it. An overflow from the vessel allows the mother liquor to run back to the saturator by gravity. The crystals of sulphate fall through the overlying mother liquor in the receiver, and a certain amount of suspended impurities and colouring matter is thereby washed out. A bottom discharge valve allows the charge of sulphate to run into the centrifugal by gravity. By this arrangement it is anticipated that a hotter charge containing fewer small crystals, and of an improved colour, will be obtained.

Railway Sidings.

The Pitwines Works are situated alongside the main line of the Southern Railway; but until the present works were projected, no sidings were installed. The first stage in the new works was the construction of sidings complete with railway weighbridge, and the provision of a petrol shunting locomotive and a 5-ton curved jib crane. Altogether some 2000 yards of standard gauge sidings have been laid; and coke, tar, acid, oil, oxide, fire goods, and general stores can now be handled direct from truck to their respective stores, or *vice versâ*.

Standardized Plant.

The gas valves throughout the works are Holmes' double-faced "Western" type, turning clockwise to open. The electric generators and all the motors are made by the British Thomson-Houston Company, and all the pumps used are of the Weir type.

Mains.

As the whole of the works stand on ground reclaimed by means of ashes, which would have a serious corrosive effect upon the mains, it has been necessary to protect them very carefully. This has been done by coating them throughout their length with a 6 in. envelope of pugged clay, recovered for the purpose from the relief holder foundations, and mixing with the trench-filling a liberal supply of precipitated chalk from the softening plant of the Company's water-works.

The whole of the reinforced concrete construction (with the exception of that required for the cableway stations and bridges, which were put in by the Mitchell Conveyor Company) together with the making and driving of the piles for the foundations, has been undertaken by Messrs. Thos. Vale & Sons, of Stourport.

In conclusion, I must put on record my indebtedness to Mr. Roy Irving, the Assistant Engineer, who has helped me in the design and erection of the new works. His capacity and zeal have been a very real help, and he has displayed all the keenness that one would expect to find in the son of one of our most respected colleagues.

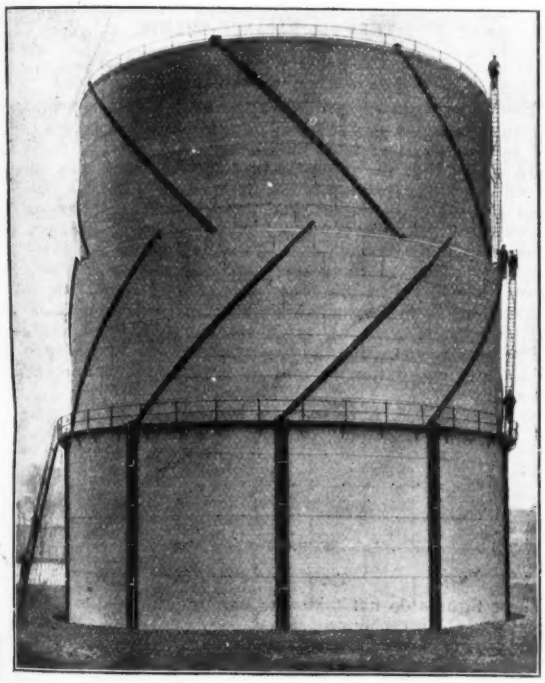
I must also pay a tribute to my Directors for the broad, sympathetic, and understanding spirit in which they have received and considered all the recommendations made to them. I realize that I am fortunate in having as Directors men used to handling big problems—men of outstanding eminence in their own respective spheres, and therefore well qualified to take the broad view and to inspire rather than to hamper their executive officials.

English Gas Men Spend.—This is the title given to the following editorial paragraph, which appears in the issue for March 21 of our American contemporary the "Gas Age-Record:" Miracles come to pass in England. Last year the British gas companies gave £75,000 to provide the marvellous exhibition of gas service and gas appliances that was shown at the British Empire Exposition at Wembley. American visitors were unanimous in their praise of this exhibit, and all concurred in the opinion that it was the best exhibit of the thousands there. We wonder what would happen if American gas men were asked to invest such a sum, equivalent to about $350,000 at the rate of exchange reigning last year, in an enterprise where they could not see the dollars flowing back to repay them for those they had spent. It is a thought to conjure with. And yet we believe that we are the foremost nation in the world when it comes to advertising.

NEW GASHOLDER AT HONLEY.

A large company of representative public men of the Holme and the Colne Valleys assembled at the Honley Urban District Council Gas-Works last Thursday, to participate in the inauguration of the new holder, which is described below. The gas was officially turned on by Mr. G. T. Oldham, J.P. (the Chairman of the Council).

Opening the proceedings, Mr. J. W. Broadhead said they were assembled to celebrate the official opening of Honley's new holder. Apart from the fact that he had the honour of representing there that morning the firm of Messrs. Robert Dempster & Sons, he might say the holder had not been installed before it was wanted. This would readily be understood when he stated that, with a maximum output during the 24 hours of 190,000 c.ft. of gas, there had been available storage of only 42,000 c.ft. How Mr. Harry Marsden (the Gas Engineer) had managed to keep the supply going was, he might say, without flattery, a miracle. Even with the new holder, Honley had only what was considered safe and proper storage for the economical carrying-on of the undertaking. Mr. Marsden would now, without the past anxieties, be able to give the consumers all the gas they required, and at a suitable pressure and of a much more uniform quality than he had been able to do in the past. The new tank held about 4000 tons of water; and it had not a single leak when filled. In connection with the contract, one of Messrs. Bryan Donkin's boosters had been installed. He had pleasure in asking Mr. Oldham, who had taken a great interest in the undertaking, officially to turn on the gas from the holder to the town; and he expressed the hope that the new structure would fulfil all that was anticipated from it, and always give great satisfaction.



The Two-Lift Spiral-Guided Holder at Honley.

The gas was then turned on by Mr. Oldham, who said he had the pleasure of seeing the first rivet put into the tank, and had put one in himself. Everything had gone on most satisfactorily, and now they had a fine holder, which was a credit to Messrs. Robert Dempster & Sons.

Mr. Broadhead asked Mr. Oldham to accept, as a memento of the occasion, a solid silver tea and coffee pot, suitably inscribed. Accepting the gift, Mr. Oldham declared that any souvenir was uncalled for; but nevertheless he should treasure the present, which would serve him well, as would the new holder the town of Honley.

After the ceremony, the company lunched together, when several toasts were honoured. "The Honley Urban District Council Gas Undertaking" was proposed by Mr. F. Littlewood, and responded to by Mr. Oldham. That of "The Contractors" was submitted by Councillor G. Borwell, and acknowledged by Mr. Broadhead. The toast of "The Visitors" was submitted by Councillor J. E. Heap (the Vice-Chairman of the Honley Council), and replied to by Mr. F. H. Robinson, of Harrogate (the President of the Manchester District Institution of Engineers). "The Engineers" was submitted by Mr. A. Whiteley, of Kirkburton—Mr. Marsden responding.

The Holder Described.

The new gasholder is of the spiral-guided type, with two lifts, in a steel tank. It has been constructed by Messrs. Robert Dempster & Sons, Ltd., of Elland, and is fitted with their "Elland" patent ball-carriages, and also their patent ladders. The holder, when fully inflated, stands 85 ft. above the ground—the outer lift being 75 ft. 6 in. in diameter by 30 ft. deep, and the steel tank 77 ft. in diameter by 30 ft. 6 in. deep—and has a capacity of 250,000 c.ft. In order to meet existing local conditions, the inner life throws a pressure of 8 in.

This holder is a further example of Messrs. Robert Dempster & Sons' improved system, which is now becoming well known, of guiding spiral holders by means of balls in place of rollers; and though this principle of guiding spiral holders was only placed on the market by them about two years ago, eight holders have already been completed, the first of which has now been working nearly eighteen months. It so happens that most of these eight holders are placed in very exposed positions, and during the past winter have been called upon to withstand gales of hurricane force. They have earned great praise from engineers who have had the opportunity of observing their very steady working under these trying conditions.

At the risk of repeating our former observations on this type of holder, we feel that a short description of the system would not be out of place. The essential differences in Messrs. Robert Dempster & Sons' improved method of construction of spiral holders lies in the carriages and the rails. Instead of, as in the ordinary system, the spiral rail passing through one or two pairs of flanged rollers, the rail (which has a circular groove on either side) passes between two pairs of case-hardened steel balls 2 in. in diameter. The rail is also provided with a second and smaller groove between the rail flange and the ball-groove, which serves to carry rain-water, &c., into the tank or cup without its having to pass promiscuously over the sheets.

Although this at first sight appears to be putting a gasholder on ball-bearings, this is not essentially true in the accepted sense of a ball-race. In an ordinary ball-bearing, the balls are free to revolve and travel in the direction of the wheel or shaft upon which it is mounted, whereas in the ball-carriage the ball is confined to a cup which prevents the ball travelling in the direction of the rail.

This point, which at first appears to be detrimental to the system, has been turned by the makers to their advantage. The diameters of the cup in which the ball rests, the ball, and the groove in the rail are arranged so that the ball is never in contact at two points diametrically opposite. The result of this is that the ball is continually spinning on an axis at right angles to the rail-face; and this axis, continually changing, prevents undue wear of any parts of the surface of the ball.

The ball-carriages themselves are made of forged steel of extremely heavy sections, and have a very large factor of safety against any stresses which the holder may be called upon to withstand. Another point of note in these ball-carriages is that all sliding parts are eliminated; the expansion and contraction of the holder being allowed for in the movement of the balls. The carriage is also fitted with a double swivel, which causes the balls automatically to set themselves parallel with the rail under any conditions, thus giving an equal bearing.

The rails themselves weigh nearly twice as much as the standard section rails used for spiral-guided holders, and are considerably stronger—special rolls having been mounted for producing them.

The Late Mr. H. E. Jones.—In connection with the funeral of Mr. H. E. Jones, brief reference was made in last week's "Journal" to the memorial service held at the Savoy Chapel, and the names of some of those present were mentioned. It should be added that the Society of British Gas Industries were represented by Mr. Samuel Cutler (Hon. Secretary), Mr. F. G. Cockey, Mr. Arthur L. Griffith (Secretary), and a representative of Messrs. Gibbons.

Treatment of Water Gas Tar.—Mr. J. D. Smith (Engineer and Manager of the Belfast Gas-Works), in a report to his Committee, says: "For a great many years—in fact, since the introduction of the carburetted water gas plant, I believe—serious trouble has been experienced with water gas tar. Very frequently this tar, immediately after leaving the plant, formed into an emulsion; and as it was useless to contractors in this form, we had to devise means for storing it until the tar and water separated. Many attempts were made to get over the difficulty, but all failed. I have had brought to my notice recently a water gas tar dehydrator manufactured by Super-Centrifugal Engineers, Ltd., of London; and the results of tests made by this plant on our tar have been eminently satisfactory. I am satisfied that the plant is efficient, and as the price is only £250 I recommend the purchase of one of these machines." The recommendation was adopted.

SCOTTISH JUNIOR GAS ASSOCIATION.
(WESTERN DISTRICT.)

The ordinary monthly meeting of the Western Juniors was held on March 28 at the Royal Technical College, Glasgow, when Mr. John M'Isaac presided over a good attendance.

The Hon. Secretary intimated that the annual general meeting would be held on Saturday, April 18.

SELECTING AND TESTING WROUGHT-IRON TUBES.

By John M'Intyre, of Glasgow.

All works should see that their tubes receive some test. A neat, reliable, and inexpensive plant can easily be rigged up at the end of the boiler house. Such a plant was in use in Glasgow up to about three years ago, and rendered excellent service. It consisted of a steam connection from a boiler, provided with a screw-down stop valve (as there is no reducing valve, this one serves the dual purpose of a stop and reducing valve), a pressure gauge to read a little above the test pressure, a tee connection with relief cock, a set of reducing couplings to accommodate various sizes of tube, and also a pair of suitable wooden trestles and V blocks with clamp, to hold the tube in a convenient position for working.

Method of Testing.

Take the length of tube to be tested, look over the outer surface, see if it is free from blemish, note the screws at both ends, try-on the coupling, then hold up to the light, look through inside, and see if there are any blisters or scale or anything abnormal. Next screw on to the coupling at the pressure gauge, and fix the coupling with a relief cock. Open the latter, so as to exhaust the air in the tube when the steam is turned on gently. When the air is removed, allow the steam to blow for a few seconds. This acts as a good scourer, and helps to cleanse the inner surface of the tube. Check the steam, close the relief cock, allow the pressure in the tube to rise to the agreed figure—(say) 25 lbs. per sq. in.—then shut-off the steam. Allow pressure to remain on for a little; and any defects will soon begin to show. The outer surface may be tapped lightly with a small hand hammer while the pressure is on, as this may assist in revealing any defect hidden by rust, scale, &c.

Some people dislike steam testing plants for wrought-iron tube, alleging that the steam leaves them wet, and they thereby become rusty. This is not the case.

Tubes at the street mains section were tested by a plant like this until the removal of the Dalmarnock Gas-Works workshops to their new premises about three years ago. Then, with no steam boiler at hand, we had to look around for some other method of testing.

An old ⊐-shaped hydraulic main was set up, and fitted with a fixed rod at the back and two swivel arms, between which a 12 ft. length of tube could be placed. The arms were swung into the box, which was filled with water. Air pressure was applied to the tube, and any defect was made visible by the air escaping causing small bubbles in the water. The tube, if satisfactory, was then removed from the trough and placed in the rack. This worked well, except for the fact that it was laborious to raise the air pressure by hand. However, the results were satisfactory enough to justify the department spending some money on a plant of the same type, but with a power-driven supply of air pressure. This was done, and the plant at present in use at the street mains section, Dalmarnock, was laid down.

The plant consists of a rectangular testing bath of mild steel plate, capable of testing tube up to about 12 ft. long, a large cylindrical receiver in which air can be stored at 30 lbs. per sq. in. pressure, a small air pump belt-driven from a wall shaft, the shaft in turn being driven by a 1½ H.P. Gardner gas engine. The pump belt striker is actuated by a cut-off device made by Messrs. Aerograph, Ltd., of London, which, when the predetermined pressure of 30 lbs. is attained at the receiver, stops the pump, and starts it up again immediately the pressure falls below this figure. When this new plant was put in operation, other items were introduced so that every aspect of the question could be taken into account, and nothing left to chance. These were a measuring rod to check lengths of consignment required of a specified length, a weighing machine to check the weight per foot run, a gauge bar to check the outside diameter, rods to ensure the correct inside diameter, and a plate gauge to test the thickness of the metal. To see how screws fit, a set of average couplings are used as gauges.

Table of Standard Sizes for the Range of Tubes in Common Use in Glasgow.

Nominal Bore. Inches.	Approx. External Diameter.	Screw. Whitworth Gas. Threads. per Inch.	Gas Quality. Thickness. W.G.	Gas Quality. Weight. Ft.-Lbs. Oz.	Steam Quality. Thickness. W.G.	Steam Quality. Weight. Ft.-Lbs. Oz.
⅛	⅜	19	14	0 6¼	12	0 7¾
¼	½	19	13	0 9	11	0 11
⅜	⅝	14	12	0 13	10	0 15¾
½	13/16	14	11	1 2¾	9	1 6¼
1	1 5/16	11	10	1 9¾	8	2 0¼
1¼	1 11/16	11	9	2 5¼	7	3 0
1½	1 7/8	11	8	2 14¾	6	3 7½
2	2⅜	11	8	2 12¾	6	4 14¾
3	3½	11	7	6 5¾	5	8 2¾
4	4½	11	7	8 3¾	5	11 8½
6	6½	11	7	13 6	5	17 4

Discussion.

The Chairman mentioned that many people thought all testing was done by the manufacturers, and emphasized the importance of giving the matter serious consideration. The approximate cost of the new machine described by Mr. M'Intyre was £140. Would Mr. M'Intyre give the meeting some data regarding the running costs, number of pipes tested per hour, and the possible output of the machine?

Mr. Simpson (Greenock) was of opinion that all pipes should be tested in a simple manner at the gas-works, before being sent out for fitting. The small expense incurred in setting-up a plant for this purpose would be more than met in the assurance of general safety.

Mr. M'Intyre explained that with the old type of steam testing they were able to handle 10 to 12 pipes per hour; but with the new plant, the output was more than doubled. The cost of testing the pipes was approximately 0·28d. per ft. The output from this machine was estimated at 300,000 ft. per annum. The percentage of condemned pipes would be about 1 p.ct., while he had known of three-quarters of a delivery being condemned for scale and blister, due to bad quality of iron.

THERMAL BALANCE-SHEETS.

By R. F. W. Blakey, of Stirling.

Theoretical Considerations.

The first real investigations of the heat losses in the destructive distillation of coal to form gas, tar, and coke were carried out by Mahler, and later by Euchêne. A survey of their results shows that the decomposition of coal in a gas retort is an endothermic reaction. The loss of heat is calculated as from 2 to 6 p.ct. of the original thermal energy of the coal. It varies with the different types of coals, being greatest with coals of a high oxygen content—a fact which indicates that the oxygen-bearing compounds are responsible for the endothermic character of the coal. Lewes states that the loss of original heat on destructive distillation of coal is about 480 B.Th.U. per lb.

The approximate distribution of the thermal energy in the products of distillation of coal at high and low temperatures is as follows:

1 Ton of Coal = 300 Therms.

	High Temperature.		Low Temperature.	
Gas	72		35	
Tar	17		26	
Volatile matter in coke	3	199	29	223
Coke	196		194	
Loss	12		16	
Total	300		300	

These figures do not take into account the heat supplied externally to effect carbonization.

The loss of heat appears to be greater if the carbonization is carried out at a low temperature; and the reasons given for this are that the loss is augmented by the exothermic reactions predominating during the first period of the distillation, when the rate of evolution of therms is greatest, and that some of this heat is lost as sensible heat, whereas during the process of complete carbonization some of the sensible heat is converted into potential heat.

The gas industry is concerned with the gaseous thermal yield; and the greatest economy must be attained by a method which is not wasteful in volatile therms. The term volatile therm is taken to apply to the total therms in both gas and tar; and to a certain extent these are interchangeable. Partially to convert therms in low-temperature tar into gaseous therms, leaving as residue high-temperature tar, is a reaction which is recognized to take place in every high-temperature carbonization process. This is not to be compared with the interchanging of high-temperature tar therms for gaseous therms. In this instance, cracking of tar to gas is doubtful economy—first owing to pitch troubles; secondly, the yield of therms in the gas which results from this cracking is small. The tar is so altered as to be of little value to the tar distiller.

In horizontal retorts working under the best conditions, with good coal, and at a combustion chamber temperature of 1300° C., it is possible to obtain a high yield of therms in the gas, and also to retain a just proportion in the tar. The gas from this method of working is low in inerts; and consequently the density is lower than that necessary for efficient use for lighting purposes. The calorific value is also higher than is necessary. Carbonization at a still higher temperature would result in a reduction in the calorific value, and would also raise the density of the gas by dilution with the poor gas obtained by cracking the tar; but this method is not to be recommended, since there is a greater loss of the original thermal energy. The yield of therms in the gas may approach a higher figure than by the process of carbonization at moderate high temperature, but only at the expense of the tar. To convert tar into gaseous therms may appear to be good practice; but when

fully considered, it is seen that the game is not worth the candle. There are several remedies at hand to reduce the calorific value of the gas—namely, dilution with water gas, producer gas, or waste gases. By any of these methods good yields of gaseous therms may be obtained, without undue degradation of gas or tar.

PRACTICAL RESULTS.

It may be of interest to consider some of the results obtained in Stirling with horizontal retorts and a Humphreys and Glasgow blue water gas plant. The carbonizing plant consists of mechanically-operated horizontal retorts, 20 ft. long and 22 in. by 16 in. cross-section.

Each oven is heated by an internal producer on the discharge side. The ascension pipes are on the discharge side. The plant was erected in 1907-8, and extended in 1910, and is specially adapted for use with the types of coal mined in the district. The average weight of charge per retort is about 8 cwt. The retorts are silica segmental.

The blue water gas plant has a capacity of 400,000 c.ft. per day, and is fitted with exhauster, station meter, and relief holder. It is an independent unit, all the gas being metered; thus control of the proportions of water gas added to the foul gas can be carried out satisfactorily. The coal used in the retorts is a mixture of Bannockburn, Plean, and Lanarkshire in the approximate proportions of 56, 17, and 27 p.ct. respectively, with the following average analysis:

	P.Ct.
Moisture	3·50
Volatile matter	35·08
Fixed carbon	57·50
Ash	3·92

Calorific value of coal as received = 13,803 B.Th.U. per lb.

The foul gas has an average analysis as follows:

	P.Ct. by Vol.
Hydrogen	53·0
Methane	30·8
Heavy hydrocarbons	2·4
Carbon monoxide	6·2
Carbon dioxide	1·3
Oxygen	0·4
Nitrogen	4·9

Average calorific value of gas = 591·4 B.Th.U. per c.ft.

The results taken over a period on the carbonization plant on the basis of 1 ton of coal retorted are as follows:

Volume of gas (corrected 30 in. and 60° Fahr.)	10,500 c ft.
Yield of tar	98 lbs.
Yield of coke	1434 lbs.
Coke used for producers	344 lbs.
Coke used for producers per 100 lbs. coal	15·3 lbs.
Temperature of combustion chambers	1270° to 1300° C.
Temperature of coke as pushed	950° C.

APPROXIMATE THERMAL BALANCE.

Therms in 1 ton of coal		309·16
,, in gas	62·10	
,, in tar	15·65	
,, in coke	03·53	
,, in coke for producer		48·84
Therms not recovered—		
Loss from original therms in coal	27·88	
Coke used in producers	48·84	
	358·00	358·00

No allowance is here made for heat recovered in retort carbon.

The water gas is added to the foul gas after cooling to approximately atmospheric temperature.

Average calorific value of water gas	310 B.Th.U. per c.ft.
Water gas in mixed gas	39·9 p.ct.
Calorific value of mixed gas	481 B.Th.U. per c.ft.

ANALYSIS OF MIXED GAS.

	P.Ct. by Vol.
Hydrogen	52·4
Methane	19·2
Heavy hydrocarbons	2·1
Carbon monoxide	19·2
Carbon dioxide	2·3
Oxygen	0·4
Nitrogen	4·4
Gaseous therms per ton of coal	84·03
Gaseous therms obtained from coke (per water gas)	21·93

The efficiency of the water-gas plant is taken at approximately 58 p.ct.

The yield of therms per ton of coal retorted has been augmented to the extent of 21·93, at the expense of the thermal energy of some of the coke, and a suitable mixed gas has been obtained. Loss of volatile therms has been avoided by reducing the cracking process at high temperatures to a minimum; and any volatile matter remaining in the coke is partially taken advantage of in water gas manufacture. The conversion of therms in coke into gaseous therms is a process of about 55 to 60 p.ct. efficiency, and could be even higher if waste-heat boilers were employed; while the cracking of tar is only reckoned as 25 p.ct. efficiency at best, and then it is also attended with grave troubles in the retort house.

THERMAL EFFICIENCY OF WATER GAS PRODUCTION.

Gas made per ton (gross) coke	61,035 c.ft. (corrected)	
Gas made per run	2,100	,, ,,
Coke to generator per 1000 c.ft. of gas made	36·7	lbs.
Dry coke to generator per 1000 c.ft. of gas made	33·03	,,
Steam to generator per 1000 c.ft. of gas made	38·0	,,
Dry coke to generator per ton of coal retorted	226·8	,,
Equivalent in coke for steam raising for generator per ton of coal retorted	27·8	,,
On basis of 1000 c.ft. water gas made.		
Input of Thermal Energy—		
Therms in coke		4·6879
Therms in steam (70 p.ct. boiler efficiency)		0·5754
Total		5·2633
Output of Thermal Energy—		
Therms in 1000 c.ft. gas		3·1000
Thermal efficiency of plant (excluding steam to drive turbine blower)		58·9 p.ct.

The determination of the thermal efficiency of the water gas plant gives a fairly reliable means of checking the working of the plant as a unit, and it is useful to note the drop in this efficiency as the plant continues in daily use. The steam to the turbine, being of constant value, does not affect the comparative figure given for the plant efficiency.

DILUTION OF COAL GAS WITH AIR.

Dilution with air is in the above instance not necessary except in such small proportions as are needed for purification purposes; and then it is added at a point where the gas has attained atmospheric temperature. The addition of air in the retort house should certainly be avoided, if the maximum thermal yield is to be obtained. Air admitted at retort doors is particularly wasteful, since it not only dilutes the gas, but causes tar to be subjected to a process of cracking in the ascension pipes. The latter are virtually converted into small tar distilleries, with partial combustion of the products taking place at the same time.

It is not always realized that the conditions of carbonization can be modified to give the required distribution of therms; and it is not a difficult matter to determine the conditions likely to be most remunerative and suitable with existing plant. It would appear that the practice to be adopted is to use charges sufficiently heavy to avoid free space in the retorts, thus preventing the degradation of gas at high temperature, and to carry out the carbonization as rapidly as possible, without making use of excessively high temperature.

The thermal balance-sheet is as important to the successful gas undertaking as the financial balance-sheet, since therms have to be bought, and afterwards sold in a more convenient form. It is a great pity that coal is not purchased on a thermal basis. It has been suggested that the smaller gas undertakings in each district should have a fully equipped technical laboratory available for their joint use. The first duty of this scheme would be to assure the delivery of the therms—and in the proper form, for two coals of the same calorific value are not necessarily of the same gas-making value. The day is not far distant when the smallest of us will demand satisfactory proof that every truck load of raw therms delivered is graded.

I would like to acknowledge the help afforded by Mr. Smith, of Stirling, in allowing me to use all data required for this paper.

Discussion.

Mr. SIMPSON (Greenock), while appreciating the manner in which Mr. Blakey had dealt with his subject, said he was inclined to differ very much from him. Mr. Blakey had treated his subject entirely from the point of view of coal conservation, while he was of opinion that they in the gas industry should give their first consideration to the financial aspect of the case. The financial balance-sheet was infinitely more important than the thermal balance-sheet; and their first duty should be to sell cheap gas. Efficiency would follow in the natural course of events. With regard to Mr. Blakey's remarks relating to dilution with waste gas and producer gas, he hoped this would not be taken up. He instanced the serious effect this would have on the mains.

Mr. BLAKEY, in reply, said that he had studied his paper purely from the technical point of view, and thought that gas made from tar instead of coke was not good business. In his opinion, tar was too valuable to break up for the manufacture of gas. With regard to dilution by waste and producer gases, he still thought that this could be carried out in small works where there was no water gas plant.

Books Received.—From Sir Isaac Pitman & Sons, Ltd., we have received the following books: "Low-Temperature Distillation," by Sidney H. North and J. B. Garbe (price 15s. net); "The Carburettor Handbook," by Ernest W. Knott (price 10s. 6d.); and "The Metal Worker's Practical Calculator," by J. Matheson (price 2s. net). The Society of Chemical Industry have forwarded a copy of Volume IX. of their "Annual Reports of the Progress of Applied Chemistry." The price of this is 7s. 6d. to members of the Society, and 12s. 6d. to non-members, post-free.

LONDON AND SOUTHERN DISTRICT JUNIOR GAS ASSOCIATION.

Visit to Woolwich Arsenal.

On Thursday afternoon, April 2, nearly a hundred members of the Association visited the Royal Arsenal, when, under the guidance of their President, Mr. W. Newton Booth, B.Sc., who was ably assisted by Messrs. Manchee, Good, Sheryer, and Ferris, they inspected the principal shops of the Royal Ordnance Factories. A visit to the Arsenal—as Mr. Booth remarked—must always prove of great interest to the Britisher; and when the visitor happens to be an engineer, this interest is doubly strong. The afternoon was thoroughly enjoyed; and all members of the Association must have realized the full meaning of the term "British engineering," when they were brought into contact with the extreme accuracy and superb skill without which the production of the mighty guns would be impossible. Perhaps the thought crept in that all this skill could be used for less irrational purposes; but as the party were representative of a gas, and not an ethical, society, this thought need not be pursued further.

An "Industrial Town."

The Arsenal is an enormous place; its area being about four square miles. To visualize it mentally, one has to adopt the "Beckton" outlook. On first visiting Beckton, one is told that there are about sixty miles of railway track; and on entering the Arsenal, which can well be termed an "industrial town," one learns that the length of track must be reckoned not in tens, but in hundreds, of miles. It will be remembered—certainly by those who endeavoured to fight their way to the 'buses in Beresford Square—that during the war there were employed at the Arsenal no fewer than 120,000 men—a number now reduced to a total of about 8000.

The Shops Visited.

The tour of inspection, which occupied nearly three hours, commenced with a Lancashire boiler house which is used for coal testing. Then, in turn, the members passed through the steel foundries; the forging shops; the heavy turneries, where there are some of the largest lathes in the country; the central power station, in which are installed four 1500-kw. D.C. sets driven by steam generated in Babcock and Wilcox water-tube boilers fitted with mechanical grates; the hydraulic power house; the north boring mills; and the new drop-stamping shop, which is in course of construction. It is intended to equip this shop with gas furnaces—indeed, at the time of the visit, one furnace was already in operation. Then the visitors were shown the pipe-fitting and furnace shop, where some of the small gas furnaces are made and tested. In this shop a small high-temperature crucible furnace was seen under test. Thence the party passed through the gun gantries, where the naval guns are stored, into the light gun factories, which comprise machine and tempering shops. Inspection of the tempering shops and boring mills for the heavy guns, the miscellaneous machine shops, where the intricate parts of the carriages are produced, and the light forges completed a tour which, with its host of vivid impressions, will long remain in the memory of members of the London and Southern District Junior Gas Association.

Thanks to the President.

Tea was then served, after which Mr. A. Broadbent (Hon. Treasurer of the Association) proposed a vote of thanks to Mr. Reginald Townsend (the Chief Superintendent of the Ordnance Factories) and to Mr. Newton Booth and his assistants. Their President, said Mr. Broadbent, must feel very gratified with the excellent attendance.

Mr. A. S. Stainer (Brentford Gas Company) seconded the vote, saying that the visit had been regarded by the Association as a very real privilege.

Mr. Newton Booth said that, to any citizen of the British Empire, a visit to the Arsenal must prove of interest—an interest which must be all the greater when the citizen happened to be an engineer. The standard of engineering work carried out at the Arsenal had a beneficial effect on the quality of engineering generally. After expressing his pleasure at seeing so many present, he said that all such visits should be well attended. Each member owed it to himself and to the Association.

"Safety First."—"Safety First," the official journal of the National "Safety First" Association, is a monthly publication, at the price of 1s. to the public, though to members of the Association it is included as part of the subscription. A feature of the first issue is a "Foreword" by the Home Secretary (Sir William Joynson-Hicks, Bart.), who is President of the Association for 1925. The industrial side of the movement is dealt with in articles by Sir Thomas Legge (Senior Medical Officer, Home Office) and by the Association's Safety Engineer. The address of the Association is 119, Victoria Street, S.W.

CORRESPONDENCE.

[We are not responsible for opinions expressed by Correspondents.]

Spirally-Guided Flying Lifts.

Sir,—With reference to the application for Patent No. 229,128/25 by Mr. William Blakeley for the application of spiral system flying lifts for guide-framed gasholders, extracts from which appeared in your issue for March 18, this is certainly not a new "invention," as Messrs. C. & W. Walker, Ltd., erected in 1897 a four-lift gasholder for the Guildford Gas Company, to designs prepared by the late Sir Corbet Woodall. The inner lift of this was 115 ft. in diameter by 24 ft. deep, and was spirally guided.

The first flying lift was, I believe, introduced by the late Sir George Livesey in connection with the Rotherhithe holder for the South Metropolitan Gas Company, some time before the East Greenwich holder was built; but this was not spirally guided. As a matter of fact, there is no advantage whatever, but several disadvantages, in adding spiral guides to the flying lift of a four-lift standard-guided holder.

R. J. Milbourne.

Lilleshall Old Hall,
near Newport, Salop.
April 6, 1925.

Mr. Philip Moon's Presidential Address.

Sir,—I regret to find that there was an error in the table of my Presidential Address [appearing at the bottom of the second column of p. 40 of the "Journal"] in which it states that a unit of electricity is equal to 3440 B.Th.U. The figure of equivalent therms—namely, 169·4 millions—is worked out on a basis of 3420 B.Th.U. per unit, which is, I think, nearer the accepted equivalent.

Philip G. G. Moon,
General Manager.

Bournemouth Gas and Water Company,
Poole Hill, Bournemouth,
March 31, 1925.

REGISTER OF PATENTS.

Coking Batteries.—No. 215,306.

Koppers Company, of Pittsburg (assignees of J. van Ackeren).

No. 22,805; Sept. 11, 1923.

Convention date: May 4, 1923.

This invention relates to coking batteries with heating walls operatively connected in pairs by ducts extending transversely of an intervening coking chamber, and reversible regenerators serving the heating walls. Batteries constructed on the above principle are described in the specifications of Joseph Becker, Nos. 171,117 and 205,459 [see "Journal," Vol. 168, p. 399].

This invention has for its primary object the provision of an oven embodying the transverse connection of heating walls, in a structure that may be operated either with coke-oven gas or as a combination oven, and yet may have the regenerators reduced to about one-half the number shown in the said prior specifications.

The invention provides the following simplifications and conveniences in construction and operation: Elimination of any supporting walls other than the usual pillar walls beneath the coking chambers; a workman is enabled to walk into a regenerator chamber, thereby greatly facilitating repairs and replacements; the heating walls and the coking chambers above the regenerators can be made of relatively great height with a relatively small increase in the height of the battery structure as a whole; and a reduction amounting to approximately one-half of the flow boxes and reversing devices required for controlling and reversing the flow of the various gases through the regenerators and flues.

Thirteen drawings and a full description are included.

Manufacture of Coal Gas and Water Gas. No. 229,042.

Neath, J., and Chaney, W., both of Victoria Street, S.W. 1.

No. 31,454; Dec. 14, 1923.

This invention relates to the manufacture of coal gas and water gas in apparatus of the kind in which one or more horizontal retorts for carbonizing coal is or are arranged to open at one end into a vertical water gas generator.

According to this invention the generator is divided and the two halves thereof with their retorts adapted to be worked alternately. In one phase steam is admitted to the generator at one side to make water gas, and this water gas mixed with rich coal gas is entirely passed to the hydraulic main. In the second phase air instead of steam is admitted to the generator to make producer gas, the main portion of which, together with a small proportion of low-grade coal gas, is passed to the combustion chamber surrounding the retorts, while the main portion of the low-grade coal gas together with a small portion of the producer gas passes to the hydraulic main either direct or through the horizontal retorts; the relative volumes of mixed gases passing to the combustion chamber and to the hydraulic main respectively in this phase being regulated by the pull of the chimney. The other generator and set of retorts are meanwhile working in the first phase. In the combustion chamber the gas meets the secondary air, then passes round the horizontal retorts, down to the bottom of the setting, round the water gas generator, thence to the recuperator, and on to the chimney; while the water gas on the other side either

goes through the horizontal retorts to the ascension pipes thereof, or direct to separate ascension pipes. In order to increase, if necessary, the temperature of the generator which is making water gas, a portion of the producer gas from the other generator, instead of entering the combustion chamber, may be passed into flues at the side of the generator, which convey it to other flues surrounding the bottom of the water gas generator, where a separate supply of secondary air is admitted for combustion.

The preliminary heating of the setting is obtained by means of gases from an outside source—say, from the adjoining bench of retorts, or from a separate water gas plant, so that the setting will not require a producer furnace for continuously heating the retorts with carbon monoxide; and after the setting is heated, no separate blow gases are used, heat being maintained by the combustion of the gas from the generator with a small proportion of coal gas as aforesaid. Inspection doors are arranged in the outer wall of the setting opposite each of the open ends of the retorts. The primary air and steam are both preheated before entering the generator.

Testing Pipe Joints.—No. 229,048.

ROSS, D., and WEISER, R. F., both of Newport, and THE BRITISH MANNESMANN TUBE CO., LTD., of Queen Victoria Street, E.C. 4.

No. 32,110; Dec. 21, 1923.

This invention for testing joints in a pipe line relates to apparatus which comprises an expansible circular casing carrying an india-rubber or other resilient band or ring having lateral lips or projections forming in conjunction with the inner face of the piping a closed annular chamber in communication with a pressure gauge, means for expanding the expansible casing so as to force the resilient lips against the inner face to render the chamber fluid-tight, and means for admitting fluid under pressure into the chamber for the purpose of ascertaining from the pressure gauge whether or not there is leakage through the pipe joint.

According to the invention, the expansible circular casing consists of a split ring whose two ends overlap or are tongued; and means are provided for forcing the two ends apart to expand the casing.

The two end portions are provided each with a lug, and alternative devices for expanding the ring are: (1) An eccentric mounted on one of the lugs and adapted to be operated to bear against a part of the other lug and thereby force the two lugs on the end portions of the ring further apart. (2) A hydraulic cylinder and ram, in valved connection with a source of fluid pressure and carried by one of the lugs, the outer end of the ram being pivotally or flexibly connected with the other lug, so that when the ram moves outwardly in respect to its cylinder the lugs will be forced further apart. (3) A right and left hand screw bolt, whose ends are connected respectively with the two lugs, and means for turning the screw bolt in a manner to force the lugs further apart.

Retort Discharger.—No. 229,378.

DRAKES LIMITED and DRAKE, J. W., both of Halifax.

No. 29,111; Nov. 19, 1923.

This invention relates to the well-known type of pusher discharger. The patentees' original invention, which is now modified, was specified in No. 2553 of 1908 [see "JOURNAL," Vol. 104, p. 212].

According to the present invention, each side of the sectional push bar is formed of two series of links, and the propelling wheel for same has radial projections (which have their driving edges in the form of the teeth of spur wheels), and these projections are made to take between each pair of the two series of links which form the side bars, their positions on the peripheral face of the wheel being arranged for this purpose.

Another feature of the invention is the provision of detachable shoes for the links, which are subject to wear at the parts which slide over the retort surface.

Gas Governors.—No. 229,419.

SIMPSON, J. F., of Scunthorpe, and PEEBLES, W. C., of Bonnington.

No. 30,335; Dec. 3, 1923.

The invention relates to station governors, and has for its object to provide means for maintaining, so far as is possible, constant pressure at the points of use under varying demand conditions.

We reproduce a sectional side elevation of one form of the governor according to the invention. The bell A of a well-known type of station governor has a spindle B carrying the usual double-beat valves C, D, which, as usual, control the flow of gas through the valve apertures E, F. In order to isolate the bell A from pressure which surrounds the valves, a small inner bell G is arranged around the spindle B.

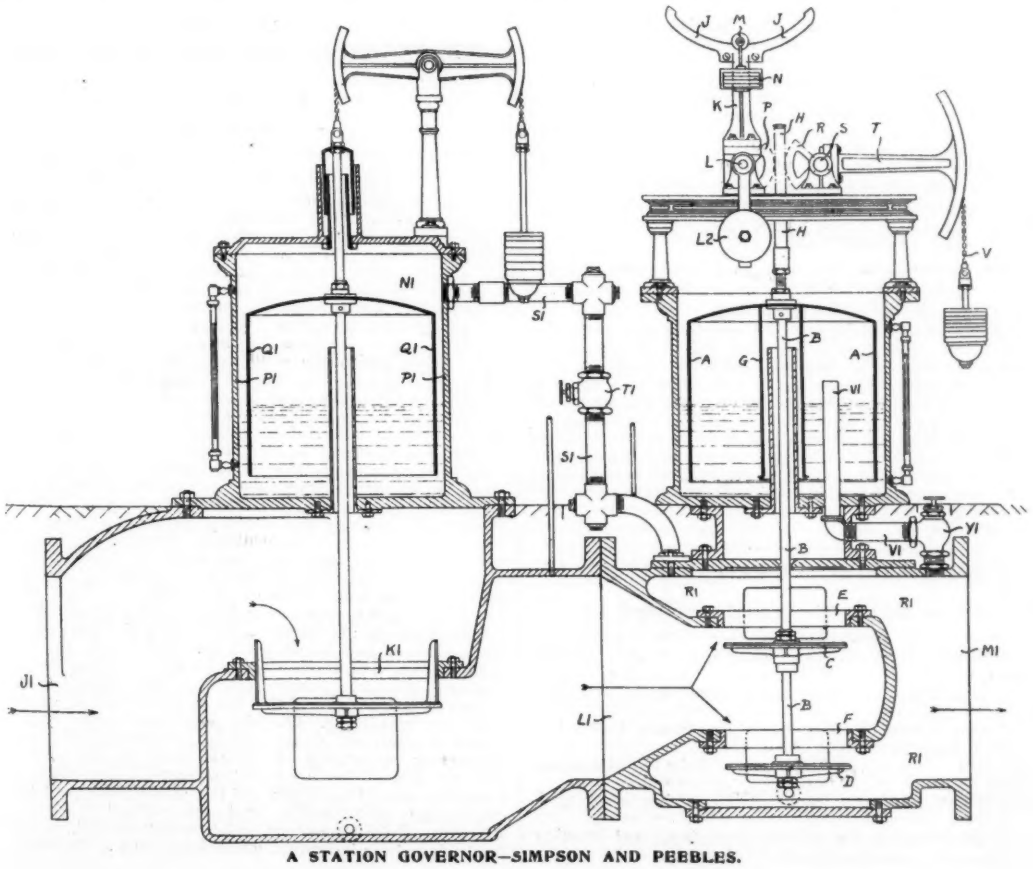
From the bell spindle B there extends upwards and through the bell-casing a toothed rack H; and to this there is operatively connected the weight-control mechanism. This mechanism consists of a curved track J carried on a lever K fixed upon a horizontal spindle L. The lever extends below the spindle, and on it is carried a weight L^2 counterbalancing lever and track. Upon the track runs a trolley M carrying upon a hanger a series of weights N by the removal or addition of one or more of which the pressure of operation can be rapidly adjusted. The lever and track are operatively connected by a tooth quadrant P fast on the spindle L and engaging the rack H with the bell A.

The bell A and its parts are partly counterpoised in the usual manner by a second toothed quadrant R engaging the rack H (which is toothed on two faces). This quadrant R is fast on a spindle S which has also fast on it the usual lever T with its quadrant and dependant chain-and-weight device V.

The effective area past the valve apertures E, F, may be varied by "hit-and-miss" or other devices, which are described and illustrated in the specification and are claimed as combined with the general arrangement.

Placed in series with and before the automatic governor is a differential governor of well-known type of which further description is unnecessary. Gas enters by its inlet J^1 and passes through valve K^1 to the inlet L^1 of the automatic governor, and thence by way of its valves to the outlet M^1 of that governor. The space N^1 within the closed and sealed casing P^1 of the bell Q^1 of this differential governor, is, however, connected with the space R^1 on the delivery side by a pipe S^1 in which is a valve T^1 adapted for fine adjustment and small areas.

The space beneath the bell A of the automatic governor is connected by a pipe V^1 with the outlet pressure by way of a needle valve Y^1. Two needle valves in parallel may be provided; a small one for that



A STATION GOVERNOR—SIMPSON AND PEEBLES.

very fine adjustment required when the combination is used, and a larger one for employing the governor as an ordinary static governor. To this end the needle valves Y^1 may also be provided with pointers and dials for indicating their positions.

Control of Water Gas and Other Cyclical Processes. No. 229,399.

Humphreys & Glasgow, Ltd., and Stelfox, J. C., both of Victoria Street, S.W. 1.

No. 29,503; Nov. 22, 1923.

This invention relates to very complete automatic control of water gas plant, &c. The arrangement is described in detail with reference to 15 drawings, and there are 19 claims; so we cannot do more than indicate the scope of the patent by extracts from the introduction.

The patentees say that it is a comparatively simple matter to arrange for the movement of the operating valves by means of hydraulic or other power, and it is assumed that such power is continuously available. The problem is, however, complicated by the fact that not only must the routine opening and closing of the various operating valves be effected in proper time and sequence, but efficient operating conditions must be maintained in the generator, and (for carburetted gas) in the fixing chambers, and (with waste-heat boilers) in the production of the steam, notwithstanding the variations in the quality and character of the solid and fluid gas-making materials, and of the gas to be produced. Above all, there must be no danger of explosion.

To overcome the dangers and disabilities attaching to all previous attempts to operate water-gas plant mechanically, the present invention not only ensures automatic change in accordance with the predetermined cycle of operation, but also repuires that the various valves actually respond to the call of the mechanism automatically directing the operation of the plant, which mechanism may be referred to as the "automatic operator." Thus, if a valve sticks or for any cause does not sufficiently complete its proper movement, the cycle is automatically stopped, so that no succeeding valve can move when any valve has failed to function—thus eliminating the danger of explosion which would otherwise exist. Coincident with the stoppage of the cycle, the supervisor is automatically notified of the stoppage and just what valve has failed, so that the trouble may be promptly corrected without danger or delay in locating it.

Furthermore, in case any valve fails to perform its movement at the proper speed, the cycle is likewise automatically stopped, and the stoppage notified—thus preventing losses and troubles otherwise occasioned by sluggish movement of any valve.

Moreover, in case of the failure of any valve to function properly, the invention also includes the automatic and safe shutting-down of the plant (except the delinquent valve, if otherwise stuck) and notification to the supervisor of such shutting-down and of just which valve has failed. Failure of the power driving the automatic operator may also cause shutting down the plant automatically and safely, notifying the supervisor.

In addition, the timing of movement of any or all of the operating valves may be immediately modified; and any or all of the following operations may be instantly suspended or resumed (or hand controlled), as may be necessary from time to time to attain the most efficient conditions for making water gas (either blue or carburetted to any desired quality), without interference with the inherent safety of the apparatus—namely:

(*a*) Down-running (in accordance with clinkering necessities).
(*b*) Secondary combustion (to govern temperatures in fixing chambers).
(*c*) Secondary combustion (of surplus CO for steam production).
(*d*) Oil supply (in accordance with quality of gas desired).

The invention provides for automatic charging of fuel to the generator, which may be likewise regulated or suspended or hand-controlled at will without interference with the inherent safety of the invention; and also for instant substitution at will of hand-control (with the actual response of each valve completely indicated and preferably in interlocked sequence) for automatic operation of the plant.

Gas Meters.—No. 229,512.

Kirkewhite Engineering Co., Ltd., and Goldspink, G. E., both of Nottingham.

No. 6680; March 15, 1924.

This invention relates to the means for attaching gas-meter diaphragms to the rim. A binding wire is used which has turned ends engaging holes in arms which are mounted on a hinge pin fixed to the rim. These arms are connected to each other by a screw or bolt which is adapted to draw the arms together and tighten up the binding wire.

As a combination with the above, the patentees claim a post in the diaphragm plate provided with a sleeve at its outer end at right-angles to the main part, and a "flag" or arm having its end jointed to the post by means of a joint pin passing through the sleeve and bearings on the flag or arm, so that the latter can be disconnected by removing the joint pin.

APPLICATIONS FOR PATENTS.

[Extracted from the "Official Journal" for April 1.]

Nos. 7712-8382.

British Mannesmann Tube Company, Ltd.—"Pipe joints." Nos. 7740, 7833.

Keith, G., and Keith & Blackman Company, Ltd., J.—"Gas governor." No. 8228.

Keith, G., and Keith & Blackman Company, Ltd., J.—"Dust-separating apparatus." No. 8229.

Schofield, D. L.—See British Mannesmann Tube Company, Ltd. Nos. 7740, 7833.

Townsend, W. W.—"Ventilation of gas-consuming apparatus." No. 7815.

Weyman, J. E.—"Means for drying, screening, and treating neutralized sulphate of ammonia crystals." No. 8083.

PARLIAMENTARY INTELLIGENCE.

HOUSE OF LORDS.

Progress of Bills.

Bills read the third time, passed, and sent to the Commons: Horley District Gas Company (Electricity Supply) and the Rochdale Corporation.

Hoylake and West Kirby Urban District Council Bill: Reported from the Select Committee, with amendments.

A Select Committee has been appointed to consider the Mansfield Corporation Bill, and will meet on Wednesday, May 13.

HOUSE OF COMMONS.

Progress of Bills.

Bills reported, with amendments: Gas Light and Coke Company, Stockton-on-Tees Corporation.

Bills read the first time, and referred to the Examiners: Horley District Gas Company (Electricity Supply), and Rochdale Corporation.

Gas Regulation Act.

Copies were presented of drafts of Special Orders proposed to be made by the Board of Trade under section 10 of the Act, on the application of the East Grinstead Gas and Water Company and the Slough Gas and Coke Company.

Bye-Products.

Colonel Crookshank asked the Secretary for Mines whether he could furnish any information as to the possible value of the oil and other important bye-products obtainable from coal; and if there was any reasonable prospect of their being successfully extracted, in view of the waste represented in this direction.

Colonel Lane-Fox said that, if the question related to processes of low-temperature carbonization, he would draw attention to the reply on Feb. 10. The value of these processes obviously depended upon the extent to which they could be operated commercially at a profit; and the Government would spare no efforts to assist in developing them and endeavouring to make them a commercial success.

Motor Spirit and Benzole.

Mr. D. Grenfell (for Mr. George Hall) asked the President of the Board of Trade whether he could give the total number of gallons of motor spirit, including benzole, used in the British Isles in 1913 and 1924; and the total number of gallons of home-produced benzole used as motor spirit in 1913 and 1924 respectively?

Mr. A. M. Samuel, in reply, said that precise information as to the consumption of motor spirit, including benzole, could not be furnished. From such particulars as were available, it might, however, be estimated that the consumption in 1913 was approximately 120,000,000 gallons, and in 1924 approximately 500,000,000 gallons. The information available did not enable a similar comparison to be made of the consumption of home-produced benzole as motor spirit.

HORLEY DISTRICT GAS (ELECTRICITY SUPPLY) BILL.

(*Concluded from p.* 66.)

Tuesday, March 24.

Mr. Tyldesley Jones, continuing his address to the Committee, said that nothing had been more striking than the way the scheme of the Gas Company had altered since its original conception. It had been said by Sir Harry Courthope-Munroe that the utilization of waste heat was the keynote; but when Mr. Seabrook had given evidence, they had found that it was nothing of the sort, because it was not at first the intention to utilize waste heat. The whole Bill was an attempt to put a restraining hand upon the activities of any electrical undertaking which might be introduced into this district. The site of the generating station had been altered since the original conception, and it was now proposed to erect the station on the gas-works site, which, he suggested, was already overcrowded. Even if the Bill were passed, the Gas Company would have to get the consent of the Electricity Commissioners to the erection of the generating station; and before the Commissioners gave their consent, they would require plans. The real matter the Committee had to consider was under which scheme would the consumer benefit most. The Gas Company proposed to charge 10d. per unit for electricity, and this was the maximum price asked for by the Electricity Company, so that there was nothing between them as to price. But, whereas the Electricity Company had a strong incentive to effect economies and reduce the price, in order to increase business, the Gas Company had not, because increases in the sale of electricity would to some extent be at the expense of gas. The gas undertaking was operated under the sliding-scale, by which increased dividends could only be paid if the price of gas were reduced; but no such sliding-scale was attached to the electricity undertaking. If the Gas Company kept-up the price of electricity, they would get more money from the electricity consumers, and, at the same time, would place gas in a more advantageous position to compete with it. With regard to the Gas Company's estimates, he said that the estimated cost of generation in the first year was £373. Of this, £300 represented maintenance and repair of plant, and wages, and £73 represented the cost of fuel for generating one-quarter of the electricity produced. He suggested that the cost of the fuel would be another three times as much, so that £220 should be added; and this would make the total generating costs £593. Also, nothing had been credited to the gas-works for the value of the waste heat which would be used, and nothing had been allowed for insurance, which latter was a big item. As to the

statement that 21 gas companies had been granted electricity powers, he said that many of them had not supplied electricity until some years after they had received powers. Even the Yorktown and Blackwater Gas and Electricity Company had not supplied electricity until twelve years after receiving powers. He suggested that the reason why these companies had at last given a supply was that, if they had not done so, their powers would have been revoked, and they would have had to face competition. A suggestion had been made to obtain a bulk supply at Horley from the Southern Railway Company; and when the railway was electrified, as it would be, no doubt the proper thing would be to get a supply in bulk. Then the advantages of generation of electricity by the utilization of waste heat would not exist. The very fact of the opportunity of obtaining a bulk supply later would be a good argument for the Gas Company to do nothing.

Mr. *R. L. Norris* (Chairman of the Electricity Company, and a member of the Reigate Rural District Council) gave evidence as to the need for electricity in Horley, and the formation of the Company by the local residents. £10,400 had been subscribed; and if the Electricity Company's scheme were not proceeded with, their money would be thrown away.

Sir HARRY COURTHOPE-MUNROE, cross-examining, pointed out that it was equally true that, if the Bill were refused, the Gas Company's expenditure would be wasted.

Evidence was also given as to the need for a supply, and as to the formation of the Electricity Company, by Mr. J. H. Robinson, Mr. C. G. Selfe, and Mr. A. C. Rowson—all Directors of the new Company, and residents of Horley.

Mr. *C. R. St. John* (Consulting Engineer, Westminster) said he was invited to attend a Committee meeting in Horley on Feb. 12, 1923, and was asked to advise generally with regard to the electricity supply in Horley and the neighbourhood. The scheme which had been prepared previously by another engineer had been rejected, because he had reported that it was on far too small a scale for Horley; and he was asked to submit an alternative one. After surveying the district, he had concluded that alternating current was the proper method of supply. It was desirable to obtain a bulk supply if possible, and his negotiations had been delayed as the result of his attempts to obtain it; but these attempts had not been successful. When the railway was electrified, places such as Horley would be able to get a bulk supply from the Southern Railway Company, and his plan was an endeavour to tide-over the period before that. His scheme consisted of a generating plant driven by an oil engine on a site near the railway station, and the distribution system was 415 to 240 volt, 3-phase, 4-wire, 50-cycle. His report was adopted by the Committee, and the decision was then made to form the Company. They had decided to proceed with the Company from the end of July, 1924. He then handed-in tables showing the estimated results and expenditure involved by his scheme. In the first year he estimated 120 consumers, in the second year 220, and in the third year 300; and the total estimated revenues for those years, including units sold, meter rents, wiring sales, and hire service, were £2200, £3900, and £5600 respectively. In the first year there would be a deficit of £335, in the second year all charges would be met, and in the third year a profit would be made for the first time. His estimated gross profit for that year was £1250. With regard to capital expenditure, this was estimated at £12,800 for the first year, £6800 for the second, and £2400 for the third. As to the charges for current, consumers would have the option of taking lighting at 10d. per unit, and power for heating and cooking at 2½d., or of paying a fixed quarterly sum for the installation, based upon the floor space of the house, *plus* 1½d. per unit for all current used for any purpose. The latter system would enable duplicate wiring to be avoided. This system had worked-out successfully in other undertakings of which he knew. It was proposed that the Company should have power to undertake the wiring of houses; and he regarded these powers as necessary where it was desired to develop a district rapidly. He knew of no undertaking which had made a profit in the first year. He was quite satisfied that the Company could give a satisfactory supply for as long as the supply was generated locally, and was so favourably impressed with the proposition that he had made an offer to subscribe one-half of the capital, or, if less than £10,000 were subscribed, to find £5000. He was also prepared to take his consulting fees to a large extent in the form of shares.

Cross-examined by Mr. Abady, he said he had been connected with a scheme for electric supply in the Wirral Rural District, where the Electricity Commissioners had held an inquiry to consider competitive schemes; and he agreed that this was an example of the fact that, where there were competitive schemes, it was usual to hold an inquiry. Mr. Abady also cross-examined with regard to an estimate of sales in the Company's prospectus, the estimate in witness's report put before the Electricity Commissioners, and the estimate now put before the Committee, to show that they all disagreed. Counsel suggested that there was practically no evidence from existing undertakings to support witness's optimism that he would sell 225,000 units in the third year, as he had estimated.

Mr. *John C. Dalton* (Ministry of Transport) gave evidence with regard to the Order made by the Electricity Commissioners in favour of the Electricity Company. Asked by Sir Harry Courthope-Munroe why the Order had been promulgated without the Gas Company being heard, he said that the Commissioners had had to consider the Electricity Company's scheme alone because the Gas Company had merely said that the Directors had had under consideration the question of obtaining powers to supply electricity, and had submitted no scheme of their own.

Mr. *M. J. Collins* (representing the Electricity Commissioners) said that the only application before the Commissioners was the application of the Electricity Company. The Gas Company had raised objection, but had given no reasons beyond the fact that they were competitors of the scheme. Objections had been raised by others with regard to the site for the generating station; and an inspector visited Horley to inspect the site, and had given the objectors an opportunity of being heard. He believed one of the objectors was the Chairman of the Gas Company, and he had had a notice that the inquiry was being held, so that the Gas Company must have known.

Sir HARRY COURTHOPE-MUNROE stated that the Commissioners had been informed that the Gas Company had definitely decided to apply for powers

Witness remarked that the present position was probably unique, in that there was one application before the Commissioners and another before Parliament, for supplying the same area.

Sir HARRY COURTHOPE-MUNROE suggested that, had the matter been before the Board of Trade, who dealt with these matters before the passing of the Electricity (Supply) Act, 1919, instead of the Electricity Commissioners, they would not have made the Order, but would have shelved it until they had ascertained what was the intention of Parliament.

Witness was of opinion that the Board of Trade would have acted in the same way as had the Commissioners.

Sir HARRY COURTHOPE-MUNROE, in reply to the Chairman, said that the Gas Company had had no notice of the inquiry at Horley. This had nothing to do with the scheme, and it was not an inquiry under the Electricity (Supply) Act; it simply had to do with the site.

Mr. *W. Sidgwick* (Messrs. Rees & Freres, Parliamentary Agents) said there were cases in which a department had done what the Electricity Commissioners had done in this case—namely, dealt with the Special Order without waiting for the decision of Parliament on the Bill. The Order, if sanctioned by the Minister of Transport, would have to be confirmed by Parliament, so that the latter would have an opportunity of considering the two together. The Electricity Commissioners could only consider the scheme before them.

Sir HARRY COURTHOPE-MUNROE said it seemed that, though the Gas Company had lodged an objection to the Electricity Company's Order, they had not stated that they wished to be heard upon it, notwithstanding that the Order was in competition with the Gas Company's Bill. Surely it was not thought that the Gas Company did not wish to be heard.

In his final speech to the Committee, Sir Harry said that the suggestion made by the Electricity Company, that the Gas Company made their application in order to restrain electrical development, was ridiculous. Development in the realm of electricity was a post-war matter. Mr. Randall had joined the Board of the Company in 1922, holding very strong views on the desirability of joining-up electricity and gas supply, and at that time had no knowledge of the first scheme prepared by the Electricity Company. He had heard about it afterwards, and this had accentuated his view that the time was ripe for the Gas Company to apply for powers. The Gas Company were first in the field, and had stolen nobody's case. It had been said that the most important matter was the interest of the consumers, and he was absolutely in agreement with that view; it was the test upon which the Bill should stand or fall. It was beyond dispute that the existing Gas Company, if the Committee thought they honestly intended to give the supply, were infinitely better fitted to carry it out than the new Company. The Electricity Company had been able to call only one engineer, whereas the Gas Company had the support of eminent engineers in Mr. Broadberry, Mr. Gill, and Mr. Seabrook. The capital to be raised by the Gas Company for the electricity undertaking would have to be sold by auction, and the premiums obtained as a result would be used for the purposes of the electricity undertaking without any charge upon it. He quoted at length from the evidence of witnesses on behalf of the Gas Company, and asked the Committee, having regard to the nature of that evidence, to allow the Bill to proceed.

After the Committee had consulted in private,

The CHAIRMAN asked how long it would take the Gas Company to complete the undertaking, in order that a supply of electricity could be given.

Sir HARRY COURTHOPE-MUNROE said that it would take twelve months from the date of Royal Assent to the Bill.

The CHAIRMAN said that in that case the Committee found the preamble of the Bill proved, but that it be an obligation upon the Gas Company to complete the works so that the supply could be given in the compulsory area in twelve months from the date of Royal Assent.

The Gas Engineer advising the Electricity Company was Mr. Arthur Valon (Messrs. W. A. Valon & Son, Civil Engineers, Westminster), but he was not called upon to give evidence.

STOCKTON-ON-TEES CORPORATION BILL.

This Bill was considered by the Unopposed Committee of the House of Commons, presided over by Mr. JAMES F. HOPE (Chairman of Ways and Means), on Wednesday, April 1, and was ordered to be reported for third reading. The purposes of the Bill are to enable the Corporation to purchase by agreement the undertaking of the Haverton Hill-on-Tees Gas Company, Ltd., which Company supply gas in part of the Urban District of Billingham, adjacent to the existing gas supply limits of the Corporation; to extend the limits of supply of the Corporation to include so much of the Urban District of Billingham as is not already within their limits, and the township of Cowper Bewley; and to confer further powers upon the Corporation with regard to the supply of electricity and consolidation of rates (see "JOURNAL" for Jan. 14, p. 83).

Mr. H. GIBBON PRITCHARD (Messrs. Sharpe, Pritchard & Co., Parliamentary Agents) said that the purchase had been undertaken with the agreement of the Billingham Urban District Council. In reply to the Chairman, he said that the whole of the area of the Company was outside the Borough of Stockton, but about half of the Urban District of Billingham was at present within the limits of supply of the Stockton Corporation.

Mr. *Arthur Valon* (Messrs. W A. Valon & Son, Civil Engineers, Westminster), who advised the Corporation in connection with the purchase, said he had examined the Haverton Hill Company's undertaking, and was satisfied that the price proposed to be paid for it—namely, £24,155—was a favourable one for the Corporation. He had made a valuation of what it would cost to replace the plant (works, mains, meters, and stoves) at the present time, and his figure was £33,286.

A series of reports on the Bill from the Board of Trade, Home Office, and Ministries of Health and Transport was then dealt with.

One suggestion in the Board of Trade report, relating to the extension of the gas limits of the Corporation, was that, if any part

of the extended limits of supply was at present supplied with gas by a non-statutory undertaking, the Corporation should be restricted from supplying gas in such area until they should have come to an agreement with the non-statutory undertaking. Mr. Pritchard said that the only recognized company really supplying gas was the Haverton Hill Company. He understood, however, that there were one or two private streets in the new area of supply which were now supplied by Messrs. Dorman Long & Co., Ltd. The Corporation did not propose to supply there unless this firm wished them to do so, but there was a provision in the Bill enabling the Corporation to enter into an agreement with the firm, or any other persons who happened to be supplying gas within the Corporation's limits, to purchase the mains and pipes, and the goodwill attaching to the business, or to pay compensation to those persons for giving up their rights to supply. In reply to Sir Ernest Moon, K.C. (a member of the Committee), Mr. Pritchard said that Messrs. Dorman Long & Co. had not raised any objection. They were well acquainted with Parliamentary procedure, and, therefore, he assumed they were satisfied with the Corporation's proposals.

Another clause to which reference was made in the Board of Trade report was that relieving the Corporation from the obligation to supply gas for other than lighting or domestic purposes from any main the capacity of which was insufficient; and the report pointed to the negotiations now taking place between the National Gas Council and the railway companies, with a view to arriving at an agreed form of clause. The form of the clause inserted in the present Bill, said Mr. Pritchard, was that which the railway companies had asked for in the Barnsley Order and the Chesterfield Act two years ago, but the railway companies had since discovered a further objection to the clause. In view of the negotiations referred to above, the Corporation had given an undertaking to the London and North Eastern Railway Company that they would accept any clause which the railway companies and the National Gas Council might agree upon. In the meantime, he asked the Committee to allow the clause already in the Bill to remain; and the Railway Company raised no objection to this. Asked by the Chairman when the new clause was likely to be settled, he said he could not hazard a statement on this, though he had seen what he believed was practically the final form of the clause. The Corporation had, however, given the Railway Company an undertaking that, should the matter not be settled by the time it was necessary to petition against the Bill, if they wished to, in the other House, the Corporation would raise no objection to the Railway Company's depositing a petition.

The Committee agreed to this suggestion.

Another clause to which reference was made in the Board of Trade Report was to enable the Corporation to refuse to supply gas or electricity to any person whose payments for the supply of either were in arrear, whether such payments were due to the Corporation in respect of a supply to the premises in respect of which such supply was demanded, or in respect of other premises. The Board of Trade report stated that the clause was much wider in its scope than clause 32 of the House of Lords Model Bill, and would enable the Corporation to cut off the supply of gas and electricity in the event of payments being in arrear in respect of either commodity supplied to any premises, occupied by the same consumer, irrespective of the circumstances under which, and the period for which, the payments might be in arrear.

Mr. Pritchard said that the Corporation supplied both gas and electricity, and wanted to deal with the consumer who (say) was taking a supply of electricity and did not pay for it, and who, when back payments were demanded, said he would not take any more electricity but would have a supply of gas. If that consumer were prepared to enter into a contract with the Corporation for a supply of gas, the Corporation were at present bound to enter into that contract, and to expend the capital necessary to enable the supply to be given. There was also a report from the Home Office which raised this point, and which stated that similar provisions were disallowed in the Chesterfield and the Swanage Gas and Electricity Bills of 1923. The matter had been threshed out at great length recently by a Committee of the House of Lords (presided over by the Earl of Clarendon) in the Hoylake and West Kirby Urban District Council Bill (see "Journal" for March 25, p. 749). The Director of Gas Administration at the Board of Trade had laid his objections before that Committee, but the Committee had unanimously granted the clause, and had granted it again in the Nottingham Corporation Bill.

The Chairman asked the effect of the model clause.

Mr. Pritchard replied that it provided that, if a consumer of gas had not paid his accounts, then the gas authority might refuse to supply him with gas. It did not meet the case of the consumer who would not pay his bill for one commodity, and demanded a supply of the other.

Sir Ernest Moon, K.C., pointed to a statement in the Home Office report that Committees had generally taken the view that the powers of one undertaking should not be used as a lever to obtain payment of money due in respect of the other.

Mr. Pritchard, in reply to the Chairman, said the consumer was safeguarded, because, if the Corporation cut off the supply of either gas or electricity, and it was found that there was good reason why the consumer had not paid his bill, then the Corporation were liable for heavy damages.

The Chairman announced that the Committee did not raise objection to the insertion of the clause.

A stand-by clause in the Bill, which the Board of Trade suggested should be amended to follow as far as possible the provisions of the Electricity (Supply) Act, 1922, with a view to uniformity, was withdrawn by the promoters.

With regard to a clause giving the Corporation power to specify the size and material of the pipes and fittings between the main and the consumer's meter, the Board of Trade suggested that there should be substituted a clause usually inserted in special Orders in accordance with the recommendation of a conference at the Board of Trade on Feb. 8, 1923, at which representatives of local authorities and of gas undertakings were present. Mr. Pritchard said that the clause in the Bill at present was taken from the House of Lords Model Bill, and only dealt with pipes and fittings between the main and the consumer's meter, which was all the Corporation desired to have power to deal with. The clause suggested by the Board of Trade would enable the Corporation to deal with pipes and fittings throughout the consumer's premises, but, to do this, they had to advertise in the "London Gazette" and in two local newspapers; they were subject to a reference to an independent gas engineer; and, if he thought fit, a local inquiry would be held, before the Corporation could do anything under the clause. The Corporation were content with the lesser power, in order to avoid that trouble. Incidentally, the consumers in Stockton had had no notice of a suggestion that the Corporation should be entitled to deal with the fittings in their houses, and it would scarcely be fair to the consumers for the Corporation to take this power.

The Committee agreed to the Corporation's proposal.

There was some discussion with regard to the suggestion in the report of the Ministry of Health that the period for repayment of the £24,155 to be borrowed for purchasing the Haverton Hill undertaking (40 years was inserted in the Bill) was too long.

Mr. Pritchard suggested that that period was not too long. In the case of the Hoylake and West Kirby Urban District Council Bill the period asked for in respect of money borrowed for purchasing an undertaking was 60 years, and the Ministry of Health had suggested 40 years. The Stockton Corporation asked for 40 years, and the Ministry suggested 35, and it was to be inferred that the Ministry always suggested a shorter period than that asked for by promoters. In the present case the Corporation had been very moderate. The undertaking to be purchased had a large future before it, and there were big prospective profits to be earned. Thus, the future ratepayer would have more revenue than the present ratepayer for meeting the repayments of sinking fund and interest on the loan, and it seemed a little hard that the present ratepayer should be burdened, as he would be if the period of repayment were reduced, when he would not have the benefit of the revenue from the undertaking.

The Chairman asked what the profits on the Haverton Hill undertaking were at present

Mr. *Valon* said the profit in 1924 was £2084, and in 1923, £2200.

Mr. Pritchard pointed out that the Corporation had agreed to reduce the price of gas.

Mr. *Valon*, in reply to Sir Ernest Moon, said the present price in the Haverton Hill Company's area was equivalent to 13·5d. per therm; after transfer the price would be 9·2d. per therm—a drop of over 4d. Asked if the plant were up-to-date, he said that the Corporation would manufacture gas at Stockton, but would use the gasholders, mains, meters, and small plant of the Haverton Hill Company. This plant was quite good. Many mains had been laid recently, and they were larger, on the whole, than one would expect to find in an undertaking of the size.

The Committee agreed to allow a period of 40 years.

As to the period of repayment of the loan necessary to defray the costs and expenses incidental to the transfer of the undertaking, for which 40 years was asked originally, the Ministry of Health suggested a shorter period. Mr. Pritchard said that he understood there was very little physical work to be carried out, except for connecting up mains, and the Corporation were prepared to accept 20 years.

Mr. Thomas Downey (Town Clerk of Stockton) proved the preamble of the Bill, which, as stated, was ordered to be reported.

BEXHILL CORPORATION BILL.

One of the objects of this Bill is to empower the Bexhill Corporation to acquire compulsorily, or by agreement, the undertaking of the Bexhill Gas and Water Company (see "Journal" for Jan. 14, p. 83). There was a petition deposited against the Bill by the Company, but when it reached a Committee of the House of Lords, presided over by the Earl of Clarendon, on Wednesday, March 25, Sir Lynden Macassey, K.C., (for the Corporation) said he was very glad indeed to be able to say that, as the result of negotiations which had taken place between the Corporation and the Company, agreement had been arrived at. Provision would be made by that settlement for the transfer of the undertaking to the Corporation, and the main terms of the agreement had been negotiated. He suggested that the Committee should allow that part of the Bill dealing with the transfer to proceed in its original form, and, when the Bill reached the Lord Chairman, and the agreement was finally reduced to formal language, the promoters would ask the Lord Chairman to include it in the Bill in substitution for the compulsory clauses. The Lord Chairman would be asked not to report the Bill to the House until that had been done.

Mr. Jacques Abady (for the Bexhill Gas and Water Company) agreed to this course.

ROCHDALE CORPORATION BILL.

This Bill has been under consideration by a Committee of the House of Lords, presided over by the Marquess of Bath, and has been ordered to be reported for third reading.

The clauses relating to the gas undertaking of the Corporation remain as indicated in the "Journal" for Jan. 28, p. 210, with the exception of one clause. This provided that if, in the opinion of the Corporation, any waste of gas or injury or risk of injury to person or property was caused, or likely to be caused, by a defective fitting, the Corporation could carry out the necessary repairs, at the expense of the consumer or house owner. The terms of the clause (it was set out fully in the "Journal") were considered by the Board of Trade to be too wide; and the following clause, which gives the Corporation power to compel repairs only in case of danger, has been substituted:

> If the Corporation shall at any time serve notice upon any consumer to the effect that an officer or servant of the Corporation has reported, after inspection of any internal piping or gas-consuming appliance or fitting on such consumer's premises, that he is of opinion that any such internal piping or gas-consuming appliance or fitting is in such a condition as to be dangerous to the occupiers of the premises, such consumer shall forthwith

carry out such works as may be necessary to remove the cause of danger. If the consumer shall fail forthwith to carry out such works as aforesaid, the Corporation may stop the gas from entering the premises of such consumer by cutting-off the service pipe or by such other means as the Corporation shall think fit. Any expenses incurred by the Corporation in cutting-off the gas from such premises may be recovered by the Corporation summarily as a civil debt.

WOLVERHAMPTON CORPORATION BILL.

One of the objects of this Bill (which was considered by the Local Legislation Committee of the House of Commons recently) was to authorize the Corporation to carry out various street works. A petition was deposited against it by the Wolverhampton Gas Company, with a view to securing protection for their apparatus; but opposition was withdrawn on the insertion of a protective clause. This clause provides that before commencing any authorized work in any street or road within 10 ft. of any of the Company's apparatus, the Corporation are to give fourteen days' notice to the Company, and to deliver plans of the work for reasonable approval. If no objection is raised by the Company within fourteen days, they shall be deemed to have approved. The Corporation are also to give the Company any further information reasonably required. If it appears to the Company that the execution of the proposed works would interfere with or endanger their apparatus, or unreasonably interfere with access thereto, or impede the supply of gas, they may, within the fourteen days, give the Corporation notice to alter the position of such apparatus as may be reasonably necessary, any difference as to the reasonable necessity of such alteration or the manner of carrying it out to be settled by arbitration. Such alterations are to be carried out by, and at the expense of, the Corporation, with as little detriment and inconvenience to the Company as the circumstances will admit, and to the reasonable satisfaction of the Engineer to the Company.

The Corporation are not to remove or displace any apparatus, or do anything to endanger it, impede the passage of gas through it, or interfere with access thereto without the consent of the Company, or in any other manner than the Company shall approve, until they have substituted other apparatus, at their own expense, and to the reasonable satisfaction of the Engineer of the Company.

Whenever, by reason of the exercise of the powers conferred on the Corporation, any apparatus other than that for which new apparatus has been substituted is rendered derelict or unnecessary, the Corporation are to pay the Company the agreed value of that apparatus, or the value as determined by arbitration; and the apparatus is to become the property of the Corporation. The Corporation are also to pay the reasonable cost of cutting-off that apparatus from other apparatus.

The Corporation are to make good any damage done to apparatus, or to make full compensation to the Company for any loss, damage, costs, or expenses which the latter may sustain. The Company may carry out alterations if they so desire, at the expense of the Corporation, if they give seven days' notice.

LEGAL INTELLIGENCE.

AN OXYGEN DISPUTE.

Judgment.

On Monday, Mr. Justice Romer delivered judgment in the action brought by the British Oxygen Company, Ltd. [See *ante*, p. 67.]

His Lordship said the plaintiffs were manufacturers and sellers of oxygen, and the defendants were manufacturers and sellers of plant capable of manufacturing oxygen gas. In December, the defendants approached Tanks & Drums, Ltd., with a view of inducing them to purchase plant by which they could manufacture oxygen for themselves, instead of purchasing it from the plaintiffs. To counteract this move, the plaintiffs offered to supply Tanks & Drums, Ltd., with oxygen at a reduced price, and stated that if the offer was not accepted by a certain date the price would be greatly increased. Unfortunately, this letter was handed by the Manager of Tanks & Drums, Ltd., to a representative of the defendants; and they caused twelve photographic copies to be made, one of which was sent to a London stockbroker for the purpose of showing what the plaintiffs were prepared to do to try to obtain customers. The plaintiffs, when they discovered the use to which the letter was being put, brought their action for an injunction, on the ground that their copyright was being infringed, and that the letter was confidential. The jurisdiction of the Courts to grant such relief was settled as long ago as the time of Lord Hardwick. It had been urged on behalf of the defendants that the letter was not a literary work; but he did not agree with this submission. He thought the plantiffs had a copyright in the letter, and to make copies of it was an infringement of their right. A further point taken on behalf of the defendants was that no relief could be granted, as the act of the plaintiffs was against public policy and in restraint of trade. Plaintiffs were justified in endeavouring to retain their customers by offering a reduction in price so long as these customers took all their oxygen from them. It was further said that the defendants' object in doing what they did was to clear themselves, and to vindicate their character. He thought, however, it was clear that the object was not to vindicate themselves, but to attack the commercial character of the plaintiffs' Company. The act of the defendants being unlawful, he must grant an injunction restraining them from publishing, printing, circulating, or exhibiting, or causing to be published, printed, circulated, or exhibited, the letter in question, or from otherwise infringing the plaintiffs' copyright therein.

As the parties had agreed to treat the motion as the trial of the action, there would also be an order for delivery up to the plaintiffs of any copies of the photographed reproduction of the letter in the possession of the defendants; and the defendants must pay the costs.

MISCELLANEOUS NEWS.

GAS REGULATION ACT APPLICATIONS.

There have appeared in the "London Gazette" the following notices regarding applications to the Board of Trade under the Gas Regulation Act.

SPECIAL ORDERS.

Devizes Corporation.

The Corporation are applying to the Board of Trade for a Special Order to authorize them to use scheduled land for gas purposes and to purchase additional lands; to define the limits of supply; to enable them to borrow further money; to establish the thermal basis of charge; to make regulations in connection with the supply of gas; and for other purposes.

Newark Corporation.

Application is being made by the Corporation for an Order under section 10, to empower them to acquire the undertaking of the Newark Gas Company; to construct a railway siding to the works; to define the limits of supply; to borrow money; and to confer various other powers upon them in connection with the carrying-on of the undertaking.

Ormskirk and District Gas and Electricity Company.

A Special Order is being sought by the Company, to give them authority to borrow further money; to enable them to set aside sums for a capital redemption fund; and to confer general powers.

GAS REGULATION ACT ORDERS.

The Director of Gas Administration has forwarded a copy of the following further Order made by the Board of Trade under section 1 of the Gas Regulation Act.

Aberdeen Corporation.

The Order is in the usual terms, but with no price figure inserted. [March 27.]

SOUTH METROPOLITAN GAS COMPANY'S BASIC PRICE.

Suggested Revision Application by the L.C.C.

At last week's meeting of the London County Council (replying to questions by Mr. J. D. Gilbert), Mr. Cyril H. M. Jacobs (the Chairman of the Public Control Committee) stated that the Committee would submit a report to the Council concerning the notice issued by the South Metropolitan Gas Company relative to the price of gas. The report, which appeared in this week's agenda, is in the following terms.

A question was raised in the Council on March 25, 1925, regarding the recent increase from 8d. to 8½d. a therm by the South Metropolitan Gas Company in the price of the gas supplied by them, such increase to take effect as from the date of reading the meters for the Lady Day quarter. As the matter is one of public interest we report the facts.

Successive reductions were made by the Company in question in the price charged for gas between Michaelmas, 1922, when the price stood at 11½d. a therm, and Michaelmas, 1923, when the price reached 8d. a therm. The Company attribute the necessity for the recent increase in price to the heavy fall in the receipts from bye-products, and to the increase in wages paid from the beginning of the year.

The price charged for gas is primarily dependent on the cost of production and distribution. No advantage is likely to accrue to the shareholders of the Company by reason of an increase in the price charged, since the dividend is limited by Act of Parliament. Under the South Metropolitan Gas Act, 1920, the price charged may include provision for a dividend of 5 p.ct. on the existing ordinary stock, and 6 p.ct. on any new ordinary stock which may be issued in future; but any addition to these dividends must be accompanied by a reduction of the price of gas below the "basic" price, which was fixed by the above-mentioned Act at 11d. a therm. The Act provides that, after allowing for the above authorized dividends, any "surplus profits" may be divided in the proportion of three-quarters to the consumers (in reduction of price), one-eighth to the stockholders, and one-eighth to the employee co-partners of the Company. The amount of the "surplus profits" is arrived at by calculating the sum by which the total amount payable by consumers during each year or half-year has been less than the amount which would have been payable if the gas had been charged for at the "basic" price. The sum so calculated is called the "consumers' share," and the amount of the "surplus profits" is a sum of which the "consumers' share" is three-quarters.

If the Company had paid the full dividend allowed by the provisions of the Act, the increase in price now made would involve a reduction of dividend. The actual dividends paid in recent years, however, have been considerably below those allowed by the Act. Under the Act, the Company would have been entitled to pay a dividend of 8·2 p.ct. on the ordinary stock for the year 1924; but the actual dividend paid was only 5¾ p.ct., a sum of £16,500 (equal to a further ¼ p.ct.) being allocated to the reserve fund, and £66,074 (equal to 1 p.ct. on the ordinary stock) to the co-partnership fund.

Under the Company's Act of 1920, the Council have a right, in the present session of Parliament, to ask for a revision of the "basic" price (at present 11d. a therm), and the necessary action is being taken accordingly. Any reduction in the "basic" price which may be obtained, however, will not necessarily affect the price which may be charged by the Company for gas, as this depends mainly (as explained above) on the cost of production and distribution. The effect of a reduction of the "basic" price will be to reduce the amount of the dividends which the Company would be *authorized* to pay, and the amount of the bonus which may be awarded to the employee co-partners of the Company.

NORTHAMPTON GAS ORDER.

Mr. H. C. Honey (Director of Gas Administration at the Board of Trade) inquired into the application of the Northampton Gas Light Company for a Special Order under section 10 of the Gas Regulation Act, on Monday, March 30, at the offices of the Board. The purpose of the Order is to extend the area of supply of the Company to include a large number of parishes in Northamptonshire.

Objections by the London, Midland, and Scottish Railway Company, the Grand Junction Canal Company, and the Weedon Gas Light, Coke, and Coal Company, Ltd., were met by the insertion of protection clauses; and the only objection remaining to be dealt with at the inquiry was that of the Northamptonshire County Council, who asked for protection beyond that afforded by general legislation with regard to roads and bridges, on the ground that the general legislation is out-of-date.

The Company were represented by Mr. S. E. Cash (Messrs. Vizard, Oldham, Crowder, & Cash, Parliamentary Agents); and the County Council by Mr. Parker (Messrs. Sharpe, Pritchard, & Co., Parliamentary Agents).

Mr. Cash dealt first with the clause releasing the Company from the obligation to supply gas from any main for other than lighting and domestic purposes, if the capacity of the main is insufficient. This was the subject of objection by the London, Midland, and Scottish Railway Company, who pointed out that the form of the clause is at present under discussion by the National Gas Council and the railway companies. As the Railway Company did not propose to attend the inquiry, he did not know whether they were relying upon the promoters not to insert the clause, or whether they were leaving it to the Board of Trade to decide whether to grant the clause or to let the matter stand over for the time being.

Mr. Honey said he had received a letter from the Railway Company to the effect that, as the promoters had agreed to wait until the clause had been settled between the National Gas Council and the railway companies, and then consider whether the clause should be inserted, it was not deemed necessary for them to be present.

Mr. Cash said he would prefer to drop the clause altogether, rather than wait for the agreement to be reached, because he gathered it would not be decided for some time.

Mr. Honey said he hoped that was not the case, because the matter had gone on long enough.

Mr. Cash, dealing with the objection of the County Council, said it was stated that the existing Acts and Orders of the Gas Company incorporated the provisions of the Gas-Works Clauses Acts, 1847 and 1871; but the provisions of those Acts, and of the existing Acts and Orders, were not sufficient for the protection of the County Council. At the time the Gas-Works Clauses Act, 1847, became law, the circumstances with regard to roads and traffic were very different from the circumstances prevailing to-day; and the provisions contained in the existing Acts and Orders were not suitable to meet the requirements of present-day traffic. It was submitted, therefore, that further provision should be made for the protection of the County Council in relation to main roads and county bridges and other works, both with regard to the existing area of supply of the Company (so far as it was within the county of Northampton) and the new area. Among other things, provision should be made for requiring works of the Company to be laid in suitable positions in roads and across bridges; for enlarging the period of notice under section 8 of the Gas-Works Clauses Act, 1847; for making further provisions as to the submission of plans for the approval of the County Council; for prohibiting interference with, or damage to, the structure of bridges; for saving the right of the County Council to widen, improve, or alter main roads and county bridges, and for relieving them from expense in connection with such widening, improvement, or alteration, arising out of the existence of pipes of the Company; for prohibiting the stopping of traffic in consequence of the operations of the Company; for requiring the Company to bear all costs due to congestion of traffic arising out of their operations; for exempting the County Council from liability in respect of damage or injury done to the works of the Company laid at an insufficient depth; and in other respects. Also, to refer differences to an arbitrator.

In their reply, the Company submitted that the provisions of the Gas-Works Clauses Acts, 1847 and 1871, which were incorporated in their existing Acts and Orders and in the proposed Order, had up to the present time been found to afford ample protection to the objectors, and that the circumstances with regard to roads and traffic had not materially altered since the passing of the Northampton Gas Act, 1919. The existing protection to county councils was afforded by general legislation; and they submitted that any change in the protection should be made by an alteration of the general law. It was also stated that the Company were informed that a meeting had been arranged to take place at an early date between the National Gas Council, in conjunction with other sub-surface users of roads, and the County Councils Association, with a view to discussing the question of the legal position of county councils as highways authorities; and they did not therefore propose to offer any further observations on the objections until after this meeting had been held.

Mr. Cash said the meeting referred to had not yet taken place; and he submitted that there was no reason why the Company should be asked to include special protection for the County Council in a matter which, after all, was governed by the general law. Although he was aware that the method of road construction had changed considerably, the provisions of the Gas-Works Clauses Act, 1847, broadly speaking, would seem to be sufficient. The question of road construction had been before Parliament on more than one occasion, and Parliament had not seen fit up to the present, by general legislation, to make any special provision with regard to mains and pipes. The Company were in Parliament as recently as 1910; but the County Council had not asked for protection then, and he did not think the Council could say that they were not then aware of the position in regard to road making. Broadly speaking, the kind of protection asked for by the Council in their objections had been declined by Committees of both Houses of Parliament from time to time in a number of Bills; but, of course, there were Bills in which certain clauses appeared. The great majority of these clauses, however, had been inserted by agreement, and had not been imposed on the promoters by Parliament. He understood that an electric lighting authority in the neighbourhood of Northampton had recently obtained an Order with regard to their undertaking, and that the County Council had not asked for similar protection against them. It was somewhat important, therefore, seeing that the Company were always in competition with electric lighting, that they should not have a burden cast upon them. Further, he believed it was an unknown thing for a clause of this kind to be imposed in respect of an existing area of supply on an application only for an additional area.

Colonel *G. S. Eunson* (Engineer and Manager to the Company) gave details as to the area to be added to the existing limits of supply.

Mr. Honey intimated that he would insert the usual clause to provide that, if the Company failed to supply within five years, their powers might be transferred. The Board of Trade did not want the Company to put a sort of "dead hand" on any of these parishes, so as not to supply themselves, and not to let anyone else do it.

Cross-examined by Mr. Parker, witness said he had always been on very friendly terms with the Surveyor to the County Council, and there had been no difficulty hitherto with regard to mains. He agreed that there might be difficulties in the future, if the Surveyor to the County Council, or his successor, were unreasonable. Asked if it would not be cheaper to settle differences that might arise by reference to an arbitrator, instead of to the Justices (reference to the Justices is provided by the Gas-Works Clauses Act), witness said he did not know how that would work out. *Prima facie* he saw no objection to going to arbitration.

Mr. Parker, referring to the statement that the County Council had not put forward clauses for their protection in 1919, explained that at that time the Council were very short-handed.

As to the period of notice to be given by the Gas Company to the County Council before carrying out works on county roads, witness said that the notice required by the Gas-Works Clauses Act was three days; and he agreed that this was rather short. He did, in fact, give the Council two or three weeks' notice; and when it was suggested that the County Council were moderate in asking for ten days, he replied that he did not think there was anything in this point. He agreed it was reasonable that the Company should be required to submit plans within seven days. As to county bridges, when requiring to carry a main over a bridge he always discussed the matter with the County Surveyor, and did not want to go through the actual structure of the bridges. It was not unreasonable to ask that the Company should not interfere with the structural part of the bridge without the consent of the Surveyor; it being provided that the Surveyor's consent should not be unreasonably withheld.

Replying to further questions, he said the Company should not be required to bear the expense of moving or deepening mains as the result of road widenings. Whether or not it was necessary to deepen a main, depended upon the circumstances. He had put mains at a certain depth at the request of the County Council; and he considered that, once a main was put in at a certain depth at the request of the Council, the Company's liability should cease. After a number of further questions had been put to him, he agreed that it would be of benefit to the Company if a main were removed to a position in which it would not be damaged when widening a road, assuming the question of cost did not arise.

Asked if it would not be reasonable that the County Council should be in the position to take the Company to arbitration if the Company wanted to stop-up the whole of a road, and for the arbitrator to decide whether it was in fact necessary to stop-up the whole road, he said that the possibility of the Company's wanting to stop-up a road wholly would be so remote that there would be no necessity for arbitration. He also maintained that damage to mains caused by steam-rollers operated by the County Council was a matter for which the Council should be responsible.

Mr. Parker then pointed out that general legislation in regard to gas mains was enacted in 1847, whereas that relating to electricity was enacted in 1899; so that the latter was more up-to-date than the former.

Witness replied that the Company did not mind restrictions, provided they applied to all sub-surface users of roads.

Mr. Parker then disputed Mr. Cash's statement that Parliament had declined to give such protection as the County Council were asking for, and said that for the most part decisions of Parliament had been in favour of this protection. Having ascertained from witness that he did not want the passage of the Order delayed, he asked, supposing the meeting between the National Gas Council and the County Councils Association agreed that, to some extent, the protection now asked for was reasonable, and the Order had already been approved, what would be the position of the County Council. Seeing that the Company did not agree to give to the County Council what witness had admitted was reasonable, would he agree to hold-up the Order?

Witness said it must be held-up, but this would inconvenience the people who wanted gas.

Re-examined by Mr. Cash, witness agreed that, if the Company now gave the County Council the protection they asked for, and it was ultimately decided that what they asked for was unreasonable, or that some lesser protection should be given, the Company would be in a worse position than any other public utility company.

Mr. Honey said he believed the view of the Board of Trade would be that they had had enough experience of holding-up Orders pending agreements by outside bodies, and that they must go on with the Order. If they were to wait for an agreement between outside bodies, the Order might drag on for another two years.

Witness, in answer to further questions in re-examination, said it did not matter very much whether general legislation with regard to gas and electricity mains was enacted in 1847 or 1899, because the necessity for the present methods of road construction had not arisen even in 1899. There was no heavy motor traffic then. He preferred to go to the Justices for the settlement of differences, rather than to arbitration, from the point of view of expense.

This concluded the case for the Order.

Mr. Parker, addressing Mr. Honey, said he had a clause which

he would like to submit, without prejudice. He did not wish to be tied to the terms of this clause.

Mr. Honey said in that case he did not want to see it. He could not take a clause submitted to him without prejudice, but would consider the clause required by the County Council.

Mr. Parker said that, if the Board of Trade would give a decision as an opposed matter on his clause, he was content; but the practice of the Board had always been that they would not decide these clause matters, and if there were no agreement between the promoters and the objectors they would not insert a clause in an Order. Therefore the position was that if the Company would not accept a clause, it was useless for him to fight for it at that inquiry, and he must take other steps to secure it. In previous cases the Board had strongly recommended the promoters to try to effect an agreement with the objectors; and he suggested that Mr. Honey might use his good offices in this case, and try to persuade the Company to accept the provisions which their only witness had agreed were reasonable. In the absence of agreement with the Company, and in the absence of Mr. Honey using his good offices to influence them to come to an agreement, he could do nothing. The County Council had no objection to the Order, in principle, subject to reasonable protection, which had been agreed to or given by Parliament in hundreds of cases. While the Company and the Council were very good friends at present, they might not always remain so; and it seemed that the best thing to do would be to arrive at a simple way of disposing of differences that might arise—namely, by arbitration. He suggested holding-up the Order for a short period, to give the parties a chance of coming to an agreement.

Some discussion then took place as to the difference between the legislation relating to gas and electricity mains.

Mr. Parker, in reply to Mr. Honey, said that the Electric Lighting (Clauses) Act, 1899, incorporated the Gas-Works Clauses Act, 1847, but superimposed other conditions. Asked how the Electric Lighting (Clauses) Act added to the provisions of the Gas-Works Clauses Act, he said he was informed that, among other things, it provided for a month's notice instead of the shorter period of three days.

Mr. Cash read an extract on the subject from the sixth edition of Michael and Will's "Gas and Water," and said he did not see any very material difference.

Mr. Honey said the case the County Council had made out was not a case for dealing with this matter in anticipation of general legislation, because their case was that, so long as they had a reasonable surveyor, and so long as the Company's officials were reasonable, they had no difficulty.

Mr. Parker said he had not put it quite so high as that. He had said that there had been no difficulty in the past, but there was no guarantee that there would not be in the future. Reasonable men sometimes fell out. His position was that it was necessary to deal with this matter here and now; otherwise they could never impose these conditions on the Company with regard to the powers it was proposed to give them under this Order.

Mr. Honey said the general view of the Board of Trade on these clauses was that, in the absence of agreement, they would not make any alteration of the general law which ought to apply to all classes of undertakers who had power to break-up roads. The County Council were asking the Board to make an alteration in the general law applicable to a single undertaking, and to put them under different statutory conditions from any other undertaking of the same kind in the county, and any other undertaking of a different class—such as electricity or water—in the county. This the Board of Trade were not prepared to do. If it could be shown that there was a case as regards this individual Company for special treatment, it was open for the County Council to do so, and the point would be considered; but they must not ask the Board to do, in respect of an individual undertaking, what ought to be done, if at all, by general legislation applicable to all undertakings.

Mr. Parker thought it would be found, if the matter were gone into, that the majority of undertakings in the county had similar provisions to those now asked in relation to the road authorities.

Mr. Honey said that all the County Council had done was to say the existing law was insufficient, and that they wanted better protection; but when they were asked what protection they wanted, they would not tell him. They were asking for an undefined alteration of the general law.

Mr. Parker said he did not attempt to differentiate the County Council from any other county council in relation to any other gas undertaking; and he did not say he had a special case in relation to this Company. His contention was that the Act of 1847 was not good enough for to-day; and this position had been recognized by, he believed, every gas company he had come across until this one. It did not seem to him to be of any use going into the details of his clause at the inquiry, because he frankly confessed that his case was not a peculiar one to this Company. The position taken up by the Board of Trade made it necessary for the County Council, if they could not agree with the Company, and if the Board of Trade could not persuade the Company to meet them further, to reserve their opposition for another place.

Mr. Honey pointed out that the County Council's objection did not comply with the provisions of the Gas Regulation Act, inasmuch as it did not state precisely the additions or modifications of the Order asked for.

Mr. Parker intimated that he would agree to be tied to the clause he had referred to previously, if Mr. Honey were prepared to go into it in detail.

Mr. Honey said he did not think he could re-open the matter; it meant starting the inquiry all over again.

Messrs. Ashmore, Benson, Pease, & Co., Ltd., of Parkfield Works, Stockton-on-Tees, have secured a contract for the construction and erection of a large gasholder for the Metropolitan Gas Company of Melbourne, Australia.

At the annual meeting of the Wellington (N.Z.) Gas Company, Ltd., the Chairman (Sir Harold Beauchamp) mentioned that a contract for a gasholder of a capacity of 2 million c.ft. had been placed with Messrs. R. & J. Dempster, Ltd., of Manchester.

INAUGURATION OF COAL-HANDLING PLANT AT NEW MILLS.

Gas engineers from various parts of the country attended the official opening, on March 28, of the retort charging and coal handling plant which, at a cost of £2000, has been installed at the gas-works of the New Mills Urban District Council. The advantages of the machine were explained by Mr. Herbert Spriggs, of Messrs. Herbert Morris, Ltd., of Loughborough, who have installed the plant. Following the inspection, the firm entertained the guests to luncheon at the Town Hall. Councillor Harry Yates (Chairman of the Gas Committee) presided, and was supported by members of the Council.

The Chairman, responding to the toast "Success to the Gas Undertaking," said that during the last few years no small amount of work had been done, though much remained still to be done. They had converted two beds of seven retorts from generator fired and luted lids to regenerator fired with self-sealing mouthpieces, and in addition had taken out a bed of five retorts (direct-fired), replacing them with a bed of seven retorts. They had also replaced an 8-in. cast-iron foul main by a 14-in. steel main, had installed a new Cornish boiler, replaced an exhauster of 8000 c.ft. per hour by one capable of dealing with 30,000 c.ft., repaired the purifiers, and, among other things, installed a 20-ton weighbridge. Extensions contemplated, at an estimated cost of £17,000, included a gasholder of 250,000 c.ft. capacity, four purifiers, washer, scrubber, and a station meter.

Mr. Spriggs, on behalf of Messrs. Herbert Morris, Ltd., presented to the Chairman, as a memento of the occasion, a silver bowl, on which was inscribed: "Presented to Councillor Harry Yates by Messrs. Herbert Morris, Ltd., Loughborough, on the occasion of the opening of the retort charging and coal handling plant, Gas-Works, New Mills, March 28, 1925."

Councillor R. Bradley (Vice-Chairman of the Gas Committee), proposing the toast "The Contractors," paid a high tribute to the firm of Messrs. Herbert Morris.

Mr. Spriggs, responding, spoke of the advantages of the new plant, which, he said, would be cumulative. In a reference to the Council's Engineer, Mr. J. S. Brown, he said they had a man of the right engineering capacity and the right energy.

TRADE NOTES.

"Renrut" Specialities.

Messrs. David Grant & Co., of East Crosscauseway, Edinburgh, have been appointed sole Scottish agents for "Renrut" patent high-pressure service cleansers, syphon pumps, &c., under arrangement with Messrs. Abbot, Birks, & Co., of No. 113, Newington Causeway, London, S.E., who are sole concessionaires.

New Plant for Belfast.

On the recommendation of the Gas Engineer (Mr. J. D. Smith), the Belfast Corporation have accepted the following tenders: Three vertical water-cooled condensers, Messrs. R. & J. Dempster, Ltd.; two Livesey washers, the Whessoe Foundry and Engineering Company, Ltd.; two horizontal scrubber-washers, the Whessoe Foundry and Engineering Company, Ltd.; and three 250,000 c.ft. per hour exhausters, Messrs. Geo. Waller & Sons.

CONTRACTS OPEN.

Vertical Retort Bricks, &c.

The Corporation of Glasgow are inviting tenders for the supply of vertical retort bricks, spurs, and tiles. [See advert. on p. 138.]

EXTENSIONS.

New Plant for Burnley.

The Burnley Town Council have adopted the recommendation that the Town Clerk, Gas Engineer, and Borough Surveyor shall take the necessary steps to prepare and submit as soon as possible a complete scheme for the erection of the first unit of the new gas-works at Old Hall to the Unemployment Grants Committee of the Ministry of Health.

New Plant for Blackburn.

On April 2 the Blackburn Town Council decided to embark on schemes for the relief of unemployment, including the erection of a holder at the Greenbank Works, and the provision of oil gas plant.

Blyth Gas Company.

The Company have in view important extension schemes. These include the erection of a 300,000 c.ft. holder at the Bedlington Works and a water condenser to deal with one million c.ft. of gas per day at the Blyth Works.

Coventry Gas-Works.

The Coventry Gas Committee recommend the City Council to approve of the second section of the scheme of extension at the gas-works at Foleshill being proceeded with at an estimated cost of £266,310, and that application be made to the Board of Trade for a Special Order under the Gas Regulation Act authorizing the borrowing of £350,000 for this purpose, and for the purpose of mains. The total scheme, which involves an estimated cost of £425,000, was originally approved in 1919, when it was decided to carry out the work of extending the plant at the gas-works in two sections. The work which it is now proposed to proceed with includes the installation of vertical retorts of 2¼ million c.ft. capacity per diem, at a cost of £96,000, and a 5 million c.ft. holder, at a cost of £90,000. In addition, it is proposed to extend the railway sidings at the works at an estimated cost of £18,500.

NORTH-EAST COAST COAL TRADE.

From our Own Correspondent.

Apart from an increased demand for prompt shipments of Northumberland steam coals, which is of little interest to gas coal consumers, the market was again featureless in the past week. There are very few signs generally of the usual rush to fill requirements before the holiday, and shippers have no anxiety about finding ample supplies to get their boats away.

Gas coal trade is no brisker, and, while the better sorts still manage to maintain fairly good prices, much more trade could be dealt with.

Wear Special makes indicate 20s. 6d. f.o.b., and best qualities 19s. 6d. to 20s. Seconds and others are 17s. to 17s. 3d., with considerable competition even at these prices.

COAL TRADE IN THE MIDLANDS.

From our Local Correspondent.

Some of the gas-works managements are beginning to sound the market with regard to new annual contracts from midsummer. Collieries have been invited to state their terms on the assumption that they will be willing to make substantial concessions if they can assure themselves of outlets for any considerable proportion of their potential production. Reductions of 2s. to 3s. on current contract rates are looked for, though some of the consuming interests put the depreciation at a higher figure. Unless the position undergoes some unforeseen change between now and June, contracts will be on a smaller scale than those made last year, when recent difficulties with regard to deliveries led engineers to seek an unusually ample margin of safety. Consumptive demand having fallen short of calculations, there is every likelihood of considerable balances being carried over from the current contracts into the new period. These balances will modify any savings which gas undertakings may effect by the bargaining which has now begun. Conditions in the coalfields show no improvement. The outlook is so uncertain that many collieries cannot see their way to make ends meet on a lowered earning capacity. However it may be with the newer pits, which, from their natural advantages and modern equipment can get coal economically, the prospect is menacing for many properties.

There are signs of slackening in the active demand that has ruled for a long time past in the best grades of house coal; individual collieries notifying a reduction of 2s.

YORKSHIRE AND LANCASHIRE COAL TRADE.

From our Local Correspondent.

Gas coals under contract in Yorkshire and Lancashire are easy, and it is anticipated that there will be some concession in regard to renewals during the next two or three months.

House coals remain steady, with indications of slightly reduced figures after Easter.

Industries are still quiet, with little business available for the lower-grade fuels at discounted prices.

Export remains dull; but there are indications of a slight recovery, orders at low figures being on the market at the present time.

At Hull at the week-end Humber bunker and export prices (f.o.b. usual shipping ports) were: South Yorkshire: Hards, Association, 19s. 3d.; screened gas coal, 19s. 6d.; washed trebles, 20s. 6d.; washed doubles, 17s. to 17s. 6d.; washed singles, 17s.; washed smalls, 13s. to 13s. 3d.; unwashed doubles, 15s. 9d. to 16s. 3d.; rough slack, 11s. to 11s. 6d.; smithy peas, 20s. to 21s. West Yorkshire: Hartleys, 17s. to 19s.; screened gas coal, 19s.; washed trebles, 17s. 6d. to 18s. 6d.; washed doubles, 16s. to 17s.; washed singles, 16s.; washed smalls, 12s. 6d. to 13s.; unwashed trebles, 18s.; unwashed doubles, 13s. 6d.; rough slack, 11s.; coking smalls, 10s. 3d. to 10s. 9d. Derbyshire and Nottinghamshire: Top hards, 19s.; washed trebles, 18s.; washed doubles, 17s. 6d. to 18s.; washed singles, 17s.; washed smalls, 12s. 9d.; unwashed doubles, 15s.; rough slack, 10s. 6d. to 11s. Yorkshire, Derbyshire, and Nottinghamshire: Screened steam coal, 15s. 3d. to 18s.; gas coke, 21s. to 23s.; furnace coke, 17s. 3d. to 18s. 6d.

In Lancashire, best qualities of slack are in good demand at prices ranging up to 16s. 6d. per ton, but common slacks are weak.

Gas Cookers for Stoke.—The Stoke-on-Trent Corporation Gas Committee are seeking sanction to a loan of £10,000 for the purchase of gas cookers.

Southend Gas Company.—It was stated in the report adopted at the annual meeting of the Company that the consumption of gas last year was 10 p.ct. more than in 1923, and that, in spite of considerable recent expenditure—a new holder, purifiers, &c., having been installed—the capital per million c.ft. of accounted-for gas was a satisfactory feature, and suggested that the Company occupied a strong position. The Chairman (Mr. J. H. Burrows, J.P., C.A.) pointed out that the gas sales last year reached nearly 902 million c.ft., and that the 10 p.ct. increase then recorded followed upon an increase of 17½ p.ct. for 1923. Ten years ago the sale of gas did not reach 440 million c.ft. "I am," remarked the Chairman, "greatly indebted to Mr. J. T. Randall, your Secretary, of whom it may be said 'Ever faithful, ever true.' I am also similarly indebted to Mr. T. F. Canning, a man who has overcome substantial difficulties, and of whom we can assert that each successive year's experience contributes additional justification of our choice of him from a short list of strong applicants." Dividends were declared on the original consolidated and new ordinary stocks at the rate of 6⅛ p.ct. per annum, on the new ordinary "B" stock 5¾ p.ct., and on the redeemable preference stock 7 p.ct., less income-tax.

CURRENT SALES OF GAS PRODUCTS.

The London Market for Tar, Tar Products, and Sulphate.

London, *April* 6.

A little more business is offering in the London tar products market in pitch, and the price is firm at about 42s. per ton in bulk at makers' works.

Creosote is rather quiet at about 7¼d. per gallon net and naked at works.

Solvent naphtha 95/160 is quite firm at about 1s. 8d. per gallon; other spirits remaining unchanged.

Tar Products in the Provinces.

April 6.

The markets for tar products are unaltered.

Pitch is still very dull, and even the low prices quoted to-day do not induce manufacturers on the Continent to purchase. They might possibly be interested in some quantity for next season at to-day's prices, but quite naturally the manufacturers feel the market is so low that they can do no harm by waiting.

Creosote is unaltered. There is a fair home demand, and a renewed inquiry for export is looked for at an early date.

Benzole is a little easier, doubtless due to the disappointment that an advance has not taken place in the price of petrol.

Solvent naphtha is steady, and the majority of manufacturers are well sold. Heavy naphtha is dull and difficult to sell.

Carbolic and cresylic are entirely neglected.

Naphthalene is almost unsaleable.

The average values for gas-works products during last week were: Gas-works coal tar, 29s. 3d. to 34s. 3d. Pitch, East Coast, 40s. to 41s. f.o.b. West Coast—Manchester, 35s. to 36s.; Liverpool, 36s. to 37s.; Clyde, 39s. to 40s. Benzole, 90 p.ct., North, 1s. 6½d. to 1s. 7½d.; crude, 65 p.ct., at 120° C., 9½d. to 10½d., naked at makers' works; 50-90 p.ct., naked, North, 1s. 1d. to 1s. 2d. Toluole, naked, North, 1s. 7½d. to 1s. 8½d., nominal. Coal-tar crude naphtha, in bulk, North, 7½d. to 8d. Solvent naphtha, naked, North, 1s. 5d. to 1s. 6d. Heavy naphtha, North, 1s. 1d. to 1s. 2d. Creosote, in bulk, North, liquid, 6¼d. to 6½d.; salty, 6¼d. to 6½d.; Scotland, 6d. to 6¼d. Heavy oils, in bulk, North, 6¾d. to 7d. Carbolic acid, 1s. 6d. to 1s. 7d. prompt. Naphthalene, £12 to £15; salts, £4 to £5, bags included. Anthracene, "A" quality 3d. per minimum 40 p.ct., purely nominal; "B" unsaleable.

Exhibition at Brighouse.

Great interest was taken in an exhibition which was organized by the Gas Department of the Brighouse Corporation, and held from March 2 to 7. All types of cookers were on view, including the Standard Cooker of the National Gas Council (exhibited by the Parkinson Stove Company, Ltd.), which is supplied on simple-hire terms by the Brighouse Gas Department. Among other cookers were the "New World" and "New World Junior," of Radiation Ltd., and the "Chef" cooker by Messrs. William Sugg. As to fires, these were well represented by the "Cosie" of the Parkinson Stove Company, the "Cinderella" of Messrs. R. & A. Main, Ltd., and a number of excellent examples manufactured by the Cannon Iron Foundries, Ltd. An interesting exhibit was that of the Gas Department in collaboration with a local firm, which was a successful attempt to show a first-class bathroom fitted with geyser, heated towel-rail, and a novel shaving fitting. A portion of the exhibit was devoted to coke, and samples of various grades were shown. Excellent results were the outcome of the week's publicity—results which reflect great credit on Mr. C. R. Ingham, the Engineer and Manager. The value of the sales was approximately £1000, which is about the normal annual sale of appliances by the Department. The great value of the exhibition, however, lies not in the actual sale of appliances, nor in the increased consumption through these new appliances, but in the increased consumption through existing apparatus, as the result of the educational work.

Dundee Gas-Works.—At a recent meeting of the Dundee Gas Committee it was reported that tenders for 100,000 tons of coal had been accepted at an average price of 21s. 6d. per ton—a drop of 5s. 6d. per ton on last year's purchases. A report by Mr. James Dickson, the Gas Manager, was read. In this he states that the storage capacity is now 4½ million c.ft., and the maximum daily output 7½ millions. The ratio of storage capacity to daily output is, he considers, low. With regard to the maintenance of gas appliances, he recommended a systematic visitation, and estimated that sixteen men, working on eight districts, could cover the city, and pay at least two visits per annum to each consumer.

Londonderry Gas Light Company.—Some trenchant criticisms of the Electricity Department of the Londonderry Corporation were passed by Mr. R. H. Smyth (Chairman) at the annual meeting of the Gas Company. It was now three months, he said, since they drew attention to the pamphlet issued by the Electricity Department in which it was stated that under their so-called "free wiring scheme" electricity was the most economical form of illumination. The Gas Company stated the actual facts—viz., that, so far from being the most economical illuminant, electricity, under this scheme, was actually 100 p.ct. dearer than gas. In justice to themselves they could not let the statement regarding the cost of the respective illuminants go unchallenged, but a more serious question was involved from the ratepayers' point of view, as to which the Company, as one of the largest ratepayers in the city, had a right to protest. To inaugurate the scheme, many thousands of pounds of the ratepayers' money was to be spent in laying cables, supplying expensive prepayment meters, wiring, and fitting in the smaller houses in the city. When the householder found that his lighting expenditure was increased, he would revert to gas. In another portion of his speech Mr. Smyth mentioned that 250 consumers had been added during the year. Reduction in prices represented £8000, or 17 p.ct. less than last year, which had been balanced by reduced expenditure. The new manufacturing plant had been completed, and was giving entire satisfaction. New mains and replacements would shortly be completed.

STOCK MARKET REPORT.

The financial crisis in France dominated the situation on the Stock Exchange last week. The rumour early in the week that the note circulation was to be increased was dissipated by M. Herriot's denial, which was followed by the resignation of the old and the appointment of the new Minister of Finance. At the moment it is impossible to say what effect the change will have on the financial policy of France. There was, however, a fair amount of selling of French Rentes and railway sterling bonds. The success of the Conversion Loan should be very gratifying to the taxpayer, as the annual saving of about £100,000 indicates a possibility of a still greater relief in the future, although perhaps not in the immediate future.

On the whole, the week closed more cheerfully, and the general tone was steady, although business was on a small scale. The Industrial and Miscellaneous Markets were rather subdued, and the Gas Market depression continued. There was renewed interest in the Newspaper group; Allied Newspapers and Daily Mirrors being prominent. Breweries were in demand, and there was a big jump of 55 points in Guinness to 610. Tobaccos also were well supported; Imperials, on rumours of another bonus, and Carreras on the remarkable expansion of business, were both marked up.

Brentford "A" and "B" stocks dropped another 3 points to 100-105; Commercial 4 p.ct. and 3½ p.ct. stocks 1 point and 2 points respectively. Dividend proximity accounted for the further rise of 1 point in Imperial Continental ordinary.

The following transactions were recorded during the week:—

On Monday, Aldershot "C" 79, Alliance and Dublin 70⅜, Bournemouth "B" 12⅝, Continental Union 7 p.ct. preference 91, European 7½, 7⅝, Gas Light and Coke 89½, 89¼, 89⅝, 3½ p.ct. maximum 63½, Imperial Continental 181, 181½, Primitiva 8s. 4½d., 8s. 10¾d., South Metropolitan 94½, 94⅜, 95, Tottenham "B" 99½, 100. Supplementary prices, Brentford 6 p.ct. mortgages 98½, Cheltenham 5 p.ct. maximum 78⅜, 4½ p.ct. debenture 61, Gloucester consolidated 89¼, 89⅜.

On Tuesday, Alliance and Dublin 69, Bombay 5¼, Brentford "A" 100, British 113½ *ex* div., Gas Light and Coke 88⅛, 89, 89½, 89⅜, 3½ p.ct. maximum 64, 4 p.ct. preference 79½, 79⅛, 3 p.ct. debenture 60½, Imperial Continental 179, 180½, 181, Ottoman 5s., Primitiva 8s. 9d., South Metropolitan 94½, 95, 3 p.ct. debenture 59½, 60½, 61⅛, Tottenham "B" 98.

On Wednesday, Alliance and Dublin 69, 69⅝, 69¾, British 113 *ex* div., Commercial 3 p.ct. debenture 58, European 7⅜, 7½, Gas Light and Coke 88⅛, 88⅜, 89¼, Imperial Continental 181, Liverpool 7 p.ct. preference 105¼ *ex* div., Primitiva 8s. 9d., 4 p.ct. 1st debentures 80¼, San Paulo 6 p.ct. preference 7 27/32, 7 29/32. South Metropolitan 94½, 95, 3 p.ct. debenture 61¼, Southampton 84, 84½. Supplementary prices, Hartlepool 5 p.ct. maximum 80¾, Uxbridge Maidenhead 4 p.ct. debenture 75, 75½.

On Thursday, Aldershot "C" 79½, British 112, 113, Gas Light and Coke 89¼, 89½, 3½ p.ct. maximum 63, 4 p.ct. preference 79½, Imperial Continental 181, 182, Montevideo 65¼, 65⅜, South Metropolitan 95⅛, 95¼. Supplementary prices, Dover 5¼ p.ct. debenture 102½.

On Friday, Alliance and Dublin 4 p.ct. debenture 66, 66½, Bombay 5 1/16, Bournemouth "B" 12⅜, Continental Union 37, Gas Light and Coke 89, 89¼, 3½ p.ct. maximum 63, 4 p.ct. preference 79½, 3 p.ct. debenture 60, Imperial Continental 180½, 181, 181½, 182, Liverpool 7 p.ct. preference 104½, 105½, Primitiva 8s. 6d., 8s. 11¼d., South Metropolitan 94⅜, 95, 95¼, South Suburban 5 p.ct. 99, 101, Tottenham "B" 99, 100. Supplementary prices, Aldershot 7 p.ct. bonds 105½.

Extremely easy conditions existed in the Money Market at the close of the week. Old day-to-day loans were continued at 3½ p.ct., while fresh money was available at 3 p.ct. Discount quotations remained weak in tendency, but the average rate at which Treasury Bills were allotted—£4 5s. 7·15d. p.ct.—had a hardening influence.

The feature of the Foreign Exchange Market was the erratic movement in the French franc in consequence of the Government's financial position. The Paris cheque closed on Friday at 92.55; but on Saturday the rumours of restorative measures to be introduced in the Chamber had a salutary effect, and the rate moved in favour of France to 91.85. Sterling was quiet but firm at 4.78¼. Belgian francs closed at 94.05, and Italian lire at 116 3/16 on Saturday.

Silver was quiet, and the price remained at 31 7/16d. per oz. Gold was also unchanged at 86s. 6d. per oz.

The Bank Rate is 5 p.ct., to which it was raised from 4 p.ct. on March 5. Bankers' deposit rates are 3 p.ct. The deposit rates of the discount houses are 3 p.ct. at call and 3½ p.ct. at notice.

Issue.	Share.	When ex-Dividend.	Dividends. Prev. Hf.Yr.	Dividends. Last Hf. Yr.	NAME.	Quotations. Apl. 3.	Rise + or Fall − on Week.	Transaction Lowest and Highest Prices.
£			% p.a.	% p.a.				
171,978	Stk.	Feb. 5	5	5	Aldershot 5 p.c. max. C.	78—81	..	79—79½
295,492	"	"	4	4	Do. 4 p.c. Pref.	71—76	..	..
2,551,868	"	Apl. 2	6½	6½	Alliance & Dublin Ord.	65—70*	..	69—70½
374,000	"	Jan. 8	4	4	Do. 4 p.c. Deb.	63—68	+2	66—66½
300,000	5	Oct. 23	8	8	Bombay, Ltd.	5—5⅛	..	5 1/16—5⅛
100,000	10	Mar. 5	8½	8½	Bournemouth 5 p.c.	12—13	..	..
435,050	10	"	7	7	Do. B 7 p.c.	12½—13⅛	..	12⅜—12⅝
150,000	10	"	6	6	Do. Pref. 6 p.c.	10⅝—11½	..	..
50,000	Stk.	Jan. 8	3	3	Do. 3 p.c. Deb.	56—59	..	..
762,025	"	"	4	4	Do. 4 p.c. Deb.	76—79	..	100
993,045	"	Mar. 5	6 1/16	6 1/16	Brentford A Con.	100—105	−3	..
900,500	"	"	6⅛	6⅛	Do. B New	100—105	−3	..
76,000	"	"	5	5	Do. 5 p.c. Pref.	95—98	..	..
306,690	"	Dec. 18	4	4	Do. 4 p.c. Deb.	76—81	..	..
181,337	"	"	6	6	Do. 6 p.c. Rich. Red. Deb.	100—105	..	..
214,740	"	Mar. 5	11½	12½	Brighton & Hove Orig.	165—170	..	..
244,200	"	"	8½	9½	Do. A Ord.	122—125	..	..
1,287,500	"	Feb. 19	4	5	Bristol 5 p.c. max.	96½—97¼*a*	..	112—113½
855,000	"	Mar. 19	8	7	British Ord.	112—117*	..	..
100,000	"	Dec. 18	7	7	Do. 7 p.c. Pref.	123—128	..	..
120,000	"	"	4	4	Do. 4 p.c. Red. Deb.	72—77	..	..
100,000	10	Dec. 18	8	6	Cape Town, Ltd.	7—8	..	..
100,000	10	Nov. 6	4½	4½	Do. 4½ p.c. Pref.	6—7	..	..
150,000	Stk.	Dec. 18	4½	4½	Do. 4½ p.c. Deb.	71—76	..	..
626,860	"	Feb. 19	6	6	Cardiff Con. Ord.	101—104	..	..
237,860	"	Jan. 8	7½	7½	Do. 7½ p.c. Red. Deb.	104—107	..	..
157,150	"	Feb. 19	5	6½	Chester 5 p.c. Ord.	89½—94½*b*	..	..
1,513,280	"	Mar. 5	6	5/14/8	Commercial 4 p.c. Cap.	90—93	−1	..
580,000	"	"	6	5⅝	Do. 3½ p.c. Cap.	89—92	−2	..
475,000	"	Dec. 18	3	3	Do. 3 p.c. Deb.	57—60	..	58
800,000	"	14 Jan. 15	—	—	Continental Union, Ltd.	37—42	..	37
200,000	"	Dec. 18	7	7	Do. 7 p.c. Pref.	88—92	..	91
660,000	"	Mar. 5	6½	6½	Croydon sliding scale	100—103	..	..
284,975	"	"	5	5	Do. max. div.	83—86	..	..
492,270	"	Feb. 19	6	9	Derby Con.	110—112*c*	..	..
55,000	"	Jan. 8	4	4	Do. Deb.	74—76*c*	..	..
1,002,180	"	Jan. 22	6	4	European, Ltd.	7—8	..	7⅜—7½
16,460,070	Stk	Feb. 19	5½	5½	Gas Light & Coke 4 p.c. Ord.	88½—90½	..	88⅝—89½
2,600,000	"	"	3½	3½	Do. 3½ p.c. max.	62—65	..	63—64
4,062,233	"	"	4	4	Do. 4 p.c. Con. Pref.	78—80	..	79½—79¾
4,761,930	"	Dec. 18	3	3	Do. 3 p.c. Con. Deb.	59—62	..	60—60½
130,000	"	—	10	10	Do. 10 p.c. Bonds	..	..	—
42,000	"	"	7½	7½	Do.* 7½ p.c. Ilford Deb.	..	..	..
82,500	"	Mar. 19	6½	6½	Hastings & St. L. 5 p.c. Conv.	92—97*	..	..
258,740	"	"	5½	5½	Do. 3½ p.c. Conv.	73—78*	..	..
70,000	10	Sept. 25	10	10	Hongkong & China, Ltd.	16—17	..	..
86,600	Stk.	Mar. 5	10	10	Hornsey 7 p.c.	138—143	..	..
1,976,000	"	Nov. 20	30	10	Imperial Continental Cap.	179—184	+1	179—182
263,950	"	Feb. 5	3½	3½	Do. 3½ p.c. Red. Deb.	71—74	..	..
235,242	"	Mar. 19	6½	6½	Lea Bridge 5 p.c. Ord.	96—101*	..	..
2,127,340	"	Feb. 19	5½	5½	Liverpool 5 p.c. Ord.	87½—88½*b*	..	..
600,000	"	Mar. 19	7	7	Do. 7 p.c. Red. Pref.	102—103*b*	..	104½—105½
165,736	"	Feb. 19	9	8	Maidstone 5 p.c. Cap.	122—132	..	..
63,480	"	Dec. 18	3	3	Do. 3 p.c. Deb.	54—59	..	..
75,000	5	Dec. 4	7	5	Malta & Mediterranean	4—4½	..	..
541,920	Stk.	Nov. 20	4	4	Montevideo, Ltd.	62—67	..	65½—65⅝
2,061,315	"	Mar. 5	5	5	Newcastle & Gateshead Con.	80—81*d*	−1	..
300,929	"	"	4	4	Do. 4 p.c. Pref.	72½—73½*d*	..	..
529,705	"	Dec. 18	3½	3½	Do. 3½ p.c. Deb.	68—69*d*	..	..
15,000	10	Mar. 5	11	12	North Middlesex 10 p.c.	..	..	..
75,940	10	"	7 7/16	8⅜	Do. 7 p.c.	..	..	..
300,000	Stk.	Dec. 4	7	9	Oriental, Ltd.	102—107	..	..
188,120	"	Jan. 8	7⅛	7⅛	Plym'th & Ston'house 5 p.c.	109—114	..	..
60,000	50	Mar. 5	13	14	Portsea Island B	96—99	..	..
100,000	50	"	12	13	Do. C	93—98	..	..
2,289,909	1	—	—	—	Primitiva Ord.	8/3—9/3	+/3	8/4½—8/11½
311,100	100	Dec. 1	4	4	Do. 4 p.c. Red. Deb.	79—81	..	80½
600,000	Stk.	Jan. 22	4	4	Do. 4 p.c. Red. Deb. 1911	63—65	..	..
220,335	"	Dec. 18	4	4	Do. B. Aires 4 p.c. Rd. Db.	65—67	..	..
321,670	"	"	4	4	Do. R'r P'te 4 p.c. Rd. Db.	65—67	..	..
150,000	10	Mar. 19	6	6	San Paulo 6 p.c. Pref.	7⅛—8⅛	+⅛	7 29/32—7 31/32
125,000	50	Jan. 2	5	5	Do. 5 p.c. Red. Deb.	43—46	..	..
270,000	Stk.	Mar. 19	5½	5½	Sheffield A	102—104*e*	−2	..
419,968	"	"	5½	5½	Do. B	102—104*e*	−2	..
1,047,000	"	"	5½	5½	Do. C	102—104*e*	−2	..
90,000	10	Oct. 23	8	6	South African	7—9	..	..
6,809,895	Stk.	Feb 19	5	6½	South Met. Ord.	94—96	..	94½—95⅛
1,295,445	"	Jan. 8	3	3	Do. 3 p.c. Deb.	59—62	..	59½—61½
734,000	"	Mar. 5	6½	6½	Do. 6½ p.c. Red. Deb.	102½—104½	..	..
91,500	"	Mar. 5	8½	8½	South Shields Con.	135—136*d*	..	..
1,185,795	"	Feb. 19	6½	6½	South Suburban Ord. 5 p.c.	99—104	−1	99—101
368,837	"	Dec. 18	5	5	Do. 5 p.c. Deb.	97—100	..	..
647,740	"	Nov. 6	5	5	South'mpt'n Ord. 5 p.c. max.	83—86	..	84—84½
121,275	"	Dec. 18	4	4	Do. 4 p.c. Deb.	72—77	..	..
250,000	"	Mar. 5	7	7	Swansea 7 p.c. Red. Pref.	101—103	..	..
200,000	"	Dec. 18	6½	6½	Do. 6½ p.c. Red. Deb.	103—105	..	..
120,000	"	Feb. 19	8	8	Tottenham District A 5 p.c.	116—119	..	..
882,275	"	"	6½	6½	Do. B 3½ p.c.	98—101	+½	98—100
181,255	"	Dec. 18	4	4	Do. 4 p.c. Deb.	75—79	..	..
258,251	"	Mar. 19	5	5	Tynemouth Con. and New	77—79*d*	..	..
197,294	"	Feb. 19	6½	6½	Uxbridge, Maidenhead, & Wycombe 5 p.c.	100—105	..	..
88,330	"	"	5	5	Do. 5 p.c. pref.	93—98	..	..
91,800	"	"	—	6½	Do. 5 p.c. Maidenh'd	90—95	..	..
					Wandsworth, Wimbledon, and Epsom—			
30,000	"	Mar. 5	9½	9½	Wandsworth A 5 p.c.	135—140	..	..
255,636	"	"	7½	7½	Do. B 3½ p.c.	114—119	..	..
392,955	"	"	6/9/6	6/9/6	Do. C and New	97—102	..	..
352,000	"	"	7⅝	7½	Wimbledon 5 p.c.	109—114	..	..
98,000	"	"	7⅝	7½	Epsom 5 p.c.	117—122	..	..
88,416	"	Dec. 18	3	3	5 p.c. Deb.	57—60	..	..

Quotations at :—*a*.—Bristol. *b*.—Liverpool. *c*.—Nottingham. *d*.—Newcastle. *e*.—Sheffield. * Ex. div.

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THE FLOW OF GASES and PROPORTIONING GAS MAINS.

By

F. SOUTHWELL CRIPPS, Assoc.M.Inst.C.E.

WALTER KING, Ltd., "Gas Journal" Offices, No. 11, Bolt Court, Fleet Street, E.C.4.

New Company.—The Geyser Manufacturing Company has been registered, with a capital of £1000.

Maryborough (Queensland) Gas and Coke Company, Ltd.—The Directors' report for the half-year ended Dec. 31, 1924, showed a profit of £1943. Out of this the Directors recommended the payment of the usual dividend of 6 p.ct. per annum, together with a bonus of 1 p.ct.

Wandsworth Gas Company's Price Increase.—The Directors of the Wandsworth, Wimbledon, and Epsom District Gas Company regret that they are compelled to raise the price of gas by $\frac{5}{8}$d per therm (approximately 2¾d. per 1000 c.ft.) from the taking of the meter indices at the Lady Day quarter; and this will apply to all consumers in the various areas supplied by the Company. This increase, which is due to the heavy fall in the values of residuals and the extra cost of living allowance, not only reduces the dividend payable to the stockholders, but also has the effect of reducing the profit-sharing bonus payable to the workmen.

Wembley Gas Exhibit.—Alderman George Ratcliffe (Chairman of the Leeds Corporation Gas Committee) emphasized the value of advertising, in the experience of the Gas Department, in the course of discussion on a grant to the Wembley Gas Exhibit, at a meeting of the Leeds City Council on April 1. He said he had always been a believer in advertising as a stimulus to trade, but he had never observed such remarkable results as during the past eighteen months in connection with the Leeds Gas Committee. They had had a surplus of more than 20,000 orders in the department within the past six months—every one of them for new consumers of gas. The Council agreed to grant £500 towards the new Wembley Gas Exhibit.

South Metropolitan Gas Bill.—In connection with the South Metropolitan Gas Company's Bill, the Croydon Town Clerk reports having obtained an undertaking from the promoters' agents: (1) To add a provision to clause 2, that any agreement therein authorized relating to working arrangements between the South Metropolitan Gas Company and certain other gas companies, shall be submitted to the Council of any county or county borough within which any part of the area of a party to the agreement is situate; and such council shall be entitled to make representations to the Board of Trade and be heard thereon before any such agreement is approved by the Board. (2) To add a new clause (7*a*) providing that the South Metropolitan Gas Company shall give notice by advertisement of the submission to the Board of Trade of any scheme for amalgamation or purchase under their Acts of 1876 or 1920 outside the Metropolis; that copies of such notice and scheme shall be sent to the county and county borough councils in which any part of an undertaking proposed to be amalgamated or purchased is situate; and that the Board of Trade shall receive any representations of such Councils thereon.

Inquiry at Blackburn.—On March 24, an inquiry was held by Mr. R. C. Cox, of the Ministry of Health, into an application by the Blackburn Corporation to borrow £60,000 for the installation of gasholders and other plant at the Greenbank Works. Sir Lewis Beard (Town Clerk) said that in 1916 the yearly output was 769 million c.ft. At present it was 1027 millions.

The Stoke-on-Trent Corporation Gas Committee are to spend £300 on repairs caused by storm damage at Etruria Gas-Works.

The Belfast Corporation have granted the free use of the Ulster Hall for a gas exhibition in September next.

The manufacture of gas has ceased at St. Anne's Works. Both plants in the borough of Lytham-St. Anne's (now amalgamated) are thus out of action.

Messrs. Tilley Brothers have, for family reasons, converted their business, which has been in existence for over a century, into a limited company, with head offices at No. 39, Victoria Street, Westminster—the premises at No. 53, Kingsland Road, E., having been disposed of.

At the annual meeting of the Tamworth Gas Light and Coke Company, Alderman G. Hoskison (Chairman of Directors) announced that the Company were going on satisfactorily. He moved that the usual half-yearly dividend of 7½ p.ct. on the old shares, and 5¼ p.ct. on the new shares be paid. Mr. Hunt seconded, and it was carried.

Speaking at a meeting of the Darlington Corporation on April 2, Mr. S. Leng, Chairman of the Gas Committee, said that, though the Committee had given nothing this year towards the rates, they had benefited the town in many ways. They had found a considerable amount of work for the unemployed, and the price of gas had been extremely low.

The members of the Football Team of the Portsea Island Gas Light Company's Athletic Club played a semi-final match on the Fratton Park Football Ground against the Royal Marines on Wednesday last. Mr. Carmichael, the Engineer, and several members of his staff were interested spectators of a most exciting match, which ended in a victory for the Company's players by 2 goals to 1. Sound defence was a characteristic feature of the team.

At a social gathering at the Bridge Hotel, Newcastle, on April 3, five old servants of the Newcastle and Gateshead Gas Company, who have retired, were the recipients of presentations in the form of cheques. Two of the recipients, Mr. F. Lunn and Mr. J. Golightly, had almost 100 years' service between them, while the remaining three, Mr. W. Ellison, Mr. J. Farbridge, and Mr. C. Lloyd, had a total of over 80 years. They were all members of the Distribution Department. Mr. R. W. Copeland, President of the Welfare Club, presided, and the presentations were made by Mr. R. Fairless, Chief Inspector of the Distribution Department, who spoke in appreciative terms of the services rendered by the recipients.

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